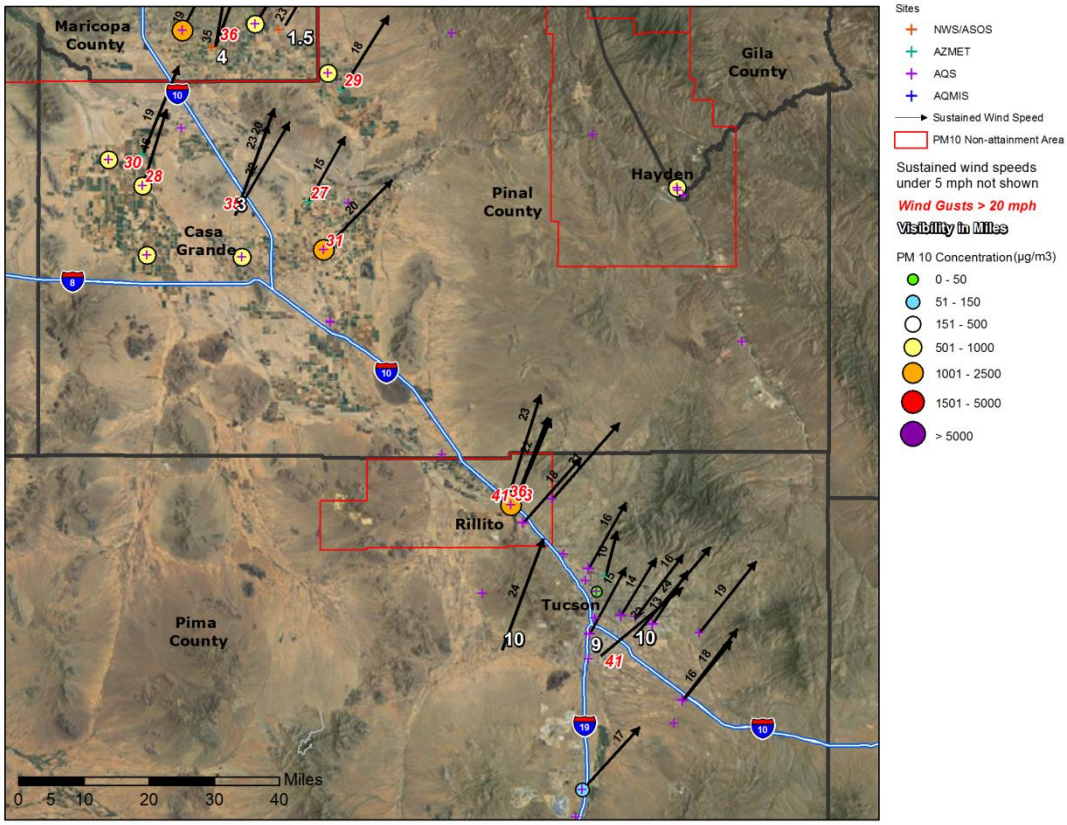
Sonoma Technology, Inc.
Air Quality Research and Innovative Solutions

State of Arizona Exceptional Event Documentation for the Event of October 4, 2011, for the Rillito PM_{10} Nonattainment Area



Final Report Prepared for

Arizona Department of Environmental Quality
Phoenix, AZ

December 2013

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State of Arizona Exceptional Event Documentation for the Event of October 4, 2011, for the Rillito PM_{10} Nonattainment Area

Final Report
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Cover graphic illustrates hourly wind speeds, visibilities, and PM_{10} concentrations in the Rillito, Arizona, area during the October 4, 2011, event. See Section 3 for more information.

Acknowledgments

The authors would like to acknowledge the Arizona Department of Environmental Quality and the U.S. Environmental Protection Agency, Region 9, for helpful discussion and feedback during the preparation of this document.

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1. Introduction

On October 4, 2011, the Rillito monitor recorded a 24-hr average PM_{10} concentration of 171 µg/m^3 (PM_{10} is particulate matter less than 10 microns in diameter). This value exceeds the National Ambient Air Quality Standard (NAAQS) of 150 µg/m^3 for 24-hr PM_{10}. This report demonstrates that this exceedance was caused by naturally occurring windblown dust, was not reasonably controllable or preventable, was historically unusual, and would not have occurred "but for" the windblown dust and, therefore, the event is an exceptional event as defined by the U.S. Environmental Protection Agency's (EPA) Exceptional Events Rule (EER).

1.1 Report Contents

Section 2 of this assessment contains a conceptual model of the windblown dust event that occurred on October 4, 2011, providing a background narrative of the exceptional event and an overall explanation of how the event affected air quality. Section 2 also provides evidence that the event was a natural event.

Section 3 of this assessment establishes a clear causal connection between the natural event on October 4, 2011, and the exceedance of the 24-hr PM_{10} standard at the monitoring station. The evidence in this section also confirms that the event in question both affected air quality and was the result of natural events.

Section 4 of this assessment contains data summaries and time-series graphs which help illustrate that the event of October 4, 2011, produced PM_{10} concentrations in excess of normal historical fluctuations.

Section 5 of this assessment details the existing dust control measures and demonstrates that despite the presence and enforcement of these controls, the event of October 4, 2011, was not reasonably controllable or preventable.

Section 6 of this assessment builds upon the demonstration, showing a clear causal connection between the natural event and the exceedance, and concludes that the exceedance of the 24-hr PM_{10} standard on October 4, 2011, would not have occurred but for the event.

Appendix A contains time-series graphs and data tables to supplement Section 3. **Appendix B** contains air quality forecasts issued by the Arizona Department of Environmental Quality (ADEQ) and weather statements and warnings issued by the National Weather Service (NWS). **Appendix C** contains a copy of the affidavit of public notice concerning this assessment report.

1.2 Exceptional Event Rule Requirements

In addition to the technical requirements contained in the EER, procedural requirements must also be met for the EPA to concur that the flagged air quality monitoring data is due to an exceptional event. This section of the report contains the requirements of the EER and associated guidance, and discusses how ADEQ has addressed those requirements.

1.2.1 Public Notification That the Event Was Occurring (40 CFR 50.14(c)(1)(i))

ADEQ issued Air Quality Forecasts indicating that south to southwesterly winds of 15 to 25 mph, gusting to 30 mph at times, could generate areas of dense blowing dust. More information on ADEQ's forecasting program can be found in Section 5.2 of this report. The forecasts and advisories that were issued for October 4, 2011, are included in Appendix B.

1.2.2 Place Informal Flag on Data in AQS (40 CFR 50.14(c)(2)(ii))

ADEQ and other operating air quality agencies in Arizona submit data into the EPA's Air Quality System (AQS), the official repository of ambient air quality data. This data submittal to AQS includes PM data from filter-based and continuous monitors operated in Arizona.

When ADEQ and/or another agency operating monitors in Arizona suspects that data may be influenced by an exceptional event, ADEQ and/or the other operating agency expedites analysis of the filters collected from the potentially affected filter-based air monitoring instruments, quality-assures the results, and submits the data into AQS. ADEQ and/or other operating agencies also submit data from continuous monitors into AQS after quality assurance is complete.

If ADEQ and/or other operating air quality agencies determine that the potential exists for a monitor's reading(s) to be influenced by an exceptional event, a preliminary flag is submitted for the measurement in AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1 following the calendar year in which the data were collected (40 CFR 58.15(a)(2)). The presence of the flag can be confirmed in AQS.

1.2.3 Notify EPA of Intent to Flag Through Submission of Initial Event Description by July 1 of Calendar Year Following Event (40 CFR 50.14(c)(2)(iii))

ADEQ submitted a letter to EPA on September 11, 2013, listing all days for calendar years 2011-2013 that ADEQ intends to analyze under the EER. The PM_{10} exceedance that occurred at the Rillito monitor on October 4, 2011, in the Rillito PM_{10} Nonattainment Area (RNA) was included on this list. This assessment report demonstrates support for the flagging of these data.

1.2.4 Document That the Public Comment Process Was Followed for Event Documentation (40 CFR 50.14(c)(3)(iv))

ADEQ posted this assessment report on the ADEQ webpage and placed a hard copy of the report in the ADEQ Records Management Center for public review. ADEQ opened a 30-day public comment period on February 7, 2014. A copy of the public notice certification, along with any comments received, will be submitted to EPA, consistent with the requirements of 40 CFR 50.14(c)(3)(iv). See Appendix C for a copy of the affidavit of public notice.

1.2.5 Submit Demonstration Supporting Exceptional Event Flag (40 CFR 50.14(a)(1-2))

At the close of the public comment period, and after ADEQ has had the opportunity to consider any comments submitted on this document, ADEQ will submit this document, the comments received, and ADEQ's responses to those comments to EPA Region 9 headquarters in San Francisco, California. The deadline for the submittal of this package is December 31, 2014.

1.2.6 Documentation Requirements (40 CFR 50.14(c)(3)(iii))

The EER states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

1.3 Guide to New Material in This Report

Naturally occurring dust events occur several times per year in Arizona, with each event requiring the preparation of exceptional events documentation. Some text in this documentation is required by the EER and is common to all the demonstrations. The text, figures, and tables unique to this event are outlined in **Table 1-1**.

Table 1-1. Summary of information unique to the Rillito October 4, 2011, event.

Section	Unique Material
Throughout the report	Event date(s) updated
Section 2.4	Event day summary
Chapter 3	Clear causal relationship
Chapter 4	Historical norm
Section 5.1.6 through Section 5.4	Source-permitted inspections and public complaints, forecasts and warnings, and wind observations
Chapters 6 and 7	But-for analysis and conclusion
Appendices A and B	Additional data and forecasts

2. Conceptual Model

This section provides a narrative background and summarizes the meteorological and air quality conditions in Rillito on October 4, 2011. This section includes

- A description and map of the geographic setting of the air quality and meteorological monitors.
- A description of Rillito's regional climate.
- An overall description of meteorological and air quality conditions on the event day.

2.1 Geographic Setting and Monitor Locations

Rillito is an unincorporated community in Pima County in southern Arizona, approximately 88 miles southeast of Phoenix and 20 miles northwest of Tucson (**Figure 2-1**). Rillito is bordered on all sides by the incorporated town of Marana. The region, along with much of southern Arizona, is in the Sonoran Desert. Rillito and Marana are flanked by the foothills of the Tortolita Mountains to the east, the Tucson Mountains to the south, and the Silver Bell Mountains to the west. Rillito and Marana lie at an elevation of approximately 1,900 feet above sea level, while peaks in each of the surrounding mountain ranges exceed 4,500 feet above sea level.

The RNA encompasses 324 square miles and nine townships. Much of the RNA comprises undeveloped land, and approximately 30% of the RNA consists of land cleared for agricultural purposes. Interstate 10 traverses the northeastern corner of the RNA, and the Silver Bell copper mine is in the southwestern corner of the RNA. Saguaro National Park is south of the RNA.

Over the past 20 years, the RNA has undergone a transformation from a predominantly rural, agricultural area to an area of substantial population growth. The town of Marana has annexed large sections of the RNA and has grown from an estimated population of just over 2,000 in 1990 to over 30,000 in 2010. The population of Rillito has also grown during this period, but because of its very small geographic area, Rillito's population was only 97 as of 2010.

The air quality and meteorological monitors used in this analysis are shown in Figure 2-1. AQS monitors measure air quality and meteorological data; Arizona Meteorological Network (AZMET) and NWS monitors measure meteorological data only. The PM_{10} exceedance on October 4, 2011, was recorded at the Rillito monitor, which has been operational since 1985 (**Figure 2-2**). In 2005, the monitor was moved to a new location less than 1,000 feet from its original location. The site is close to residential and industrial areas (chiefly, the CalPortland cement plant). Collocated wind data are available from the Rillito monitor. One AZMET monitor was in operation near the Rillito monitor during the October 4, 2011, dust event. There are no official NWS monitors in the immediate vicinity of Rillito. However, data from two NWS monitors in Tucson (about 15 to 20 miles away) and Casa Grande (about 50 miles away) are used in this report to illustrate regional weather conditions.

Recent analyses have determined that the I-10 corridor between Marana/Rillito and Casa Grande is particularly susceptible to dust storms and fatal traffic accidents due to the associated low visibilities.[1] These analyses identify this region as particularly susceptible to dust storms because much of the land was originally used for agricultural purposes. That land has since been largely abandoned and allowed to revert to open desert. Desert soil that has been farmed and then abandoned in this manner takes a long time to recover. As a result, there is a dearth of vegetation to hold down or catch blowing dust. Most of this land is located from Rillito northward into Pinal County.

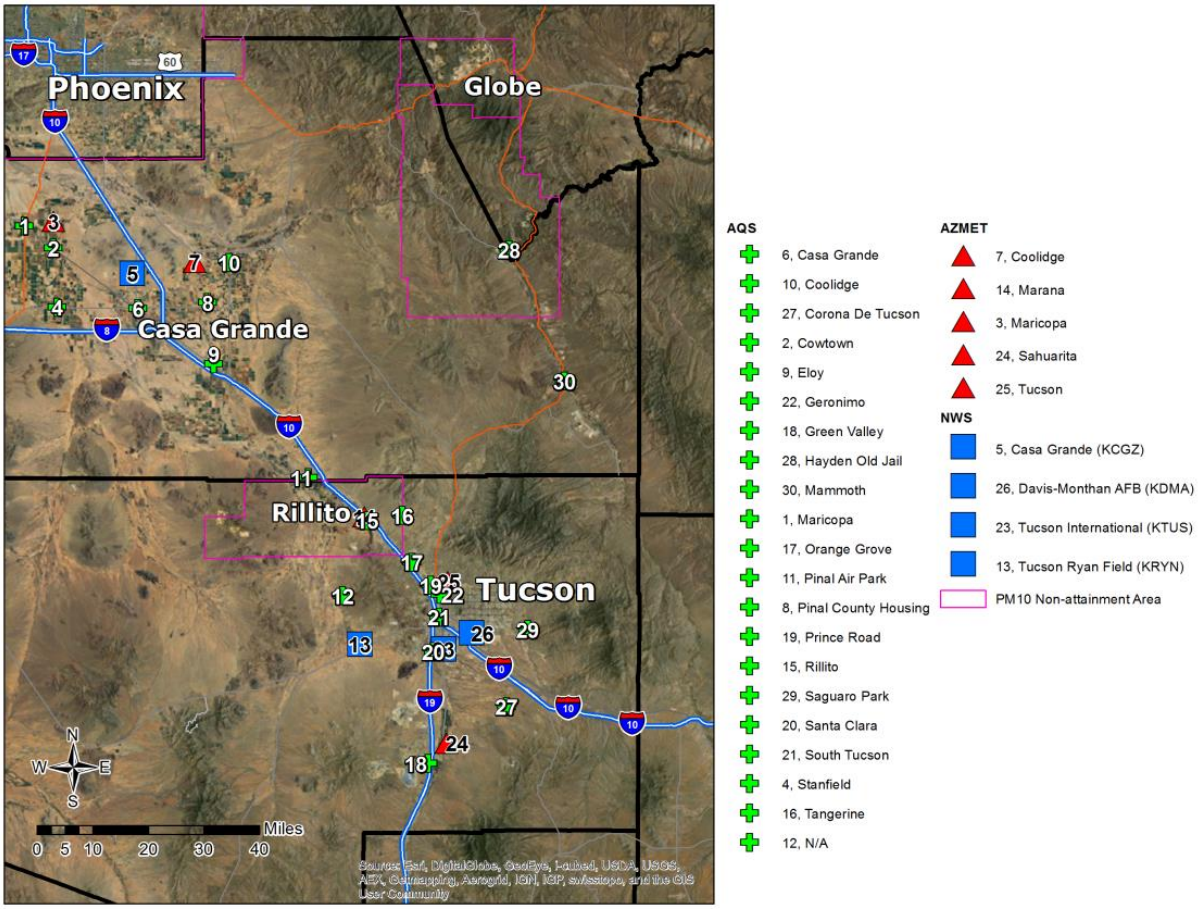

Figure 2-1. Air quality and meteorological monitors in Pima and Pinal counties.

[1] Several media outlets reported on the I-10 corridor dust storm analyses, including http://bit.ly/1gClpJq.

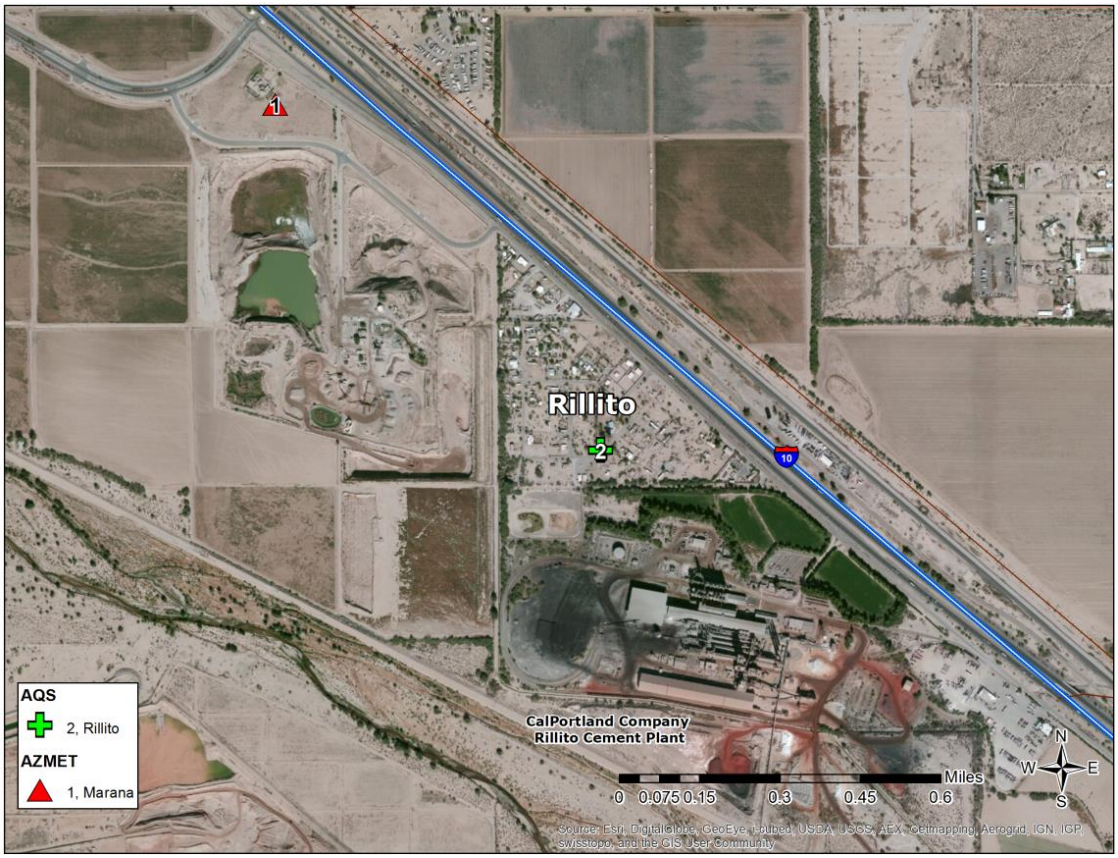

Figure 2-2. Air quality and meteorological monitors in the immediate Rillito region.

2.2 History of PM_{10} Attainment Status for Rillito

ADEQ began monitoring PM in what is now the RNA in 1971. The original measurement standard for PM, known as total suspended particulate matter (TSP), included a size range of particles collected by high-volume samplers (generally particles up to 40 microns in diameter). PM_{10} monitoring began in the RNA in 1985 on a sampling schedule of once every six days. Daily PM_{10} monitoring in the RNA began on April 1, 2010. On July 1, 1987, EPA revised PM standards to include only PM_{10} (52 FR 24634). As part of the implementation policy for the new standards, where insufficient observational PM_{10} data were available, EPA categorized areas of the country according to their probability of violating the standards: (1) Group I areas have a high probability of violating the standards, (2) Group II areas have a moderate probability of violating the standards, and (3) Group III areas are unlikely to violate the standards.

EPA listed Rillito as a Group I area. As a result, the state of Arizona was required to submit a State Implementation Plan (SIP) within nine months of the promulgation of the NAAQS (52 FR 24672, July 1, 1987, and 52 FR 29383, August 7, 1987).

Prior to the state of Arizona's submission of a SIP, EPA updated its initial geographic descriptions for the Group I and Group II areas. Consistent with EPA's PM_{10} grouping scheme, the Rillito Group I Area was designated and classified as a moderate PM_{10} nonattainment area

upon enactment of the 1990 Clean Air Act (CAA) amendments, effective November 15, 1990. This action included requirements for submittal of an attainment demonstration and reasonably available control measures (RACM) implementation provisions by November 15, 1991.

ADEQ submitted a PM_{10} moderate nonattainment area attainment demonstration for the RNA on November 14, 1991. In a letter dated May 14, 1992, EPA found this plan to be incomplete because it lacked an emissions inventory. On April 22, 1994, ADEQ submitted a revised PM_{10} attainment plan for Rillito. In a letter dated August 18, 1994, EPA found the revised plan to be incomplete because of a lack of RACM. EPA has not taken further action on the 1994 PM_{10} plan.

No exceedances of the 24-hr PM_{10} NAAQS occurred in the RNA from 1990 through 2006. As a result, EPA determined that the RNA had met the PM_{10} NAAQS and issued a "clean data" finding for the area in 2006. Subsequently, ADEQ submitted to EPA a PM_{10} Limited Maintenance Plan (LMP) and a request for redesignation of the area to attainment. The LMP is a streamlined alternative to the reporting required under a regular Maintenance Plan.

2.3 Climate

Rillito's climate is typical of the desert region of the southwestern United States. The warmest months of the year are June through August, when average daily maximum temperatures are near 100°F (**Figure 2-3**). Average annual rainfall in Rillito is nearly 12 inches. The bulk of this rain usually falls during July through September, with a secondary maximum during December through February. During December through February, winter storms originating from the Pacific Ocean can produce significant rains in southern Arizona. During July through September, monsoonal moisture originating from the Gulf of California and Gulf of Mexico, as well as large thunderstorm complexes over the Sierra Madre Occidental Mountains in Mexico, move northward into Arizona. Prevailing winds in the Tucson/Rillito area are from the southeast.

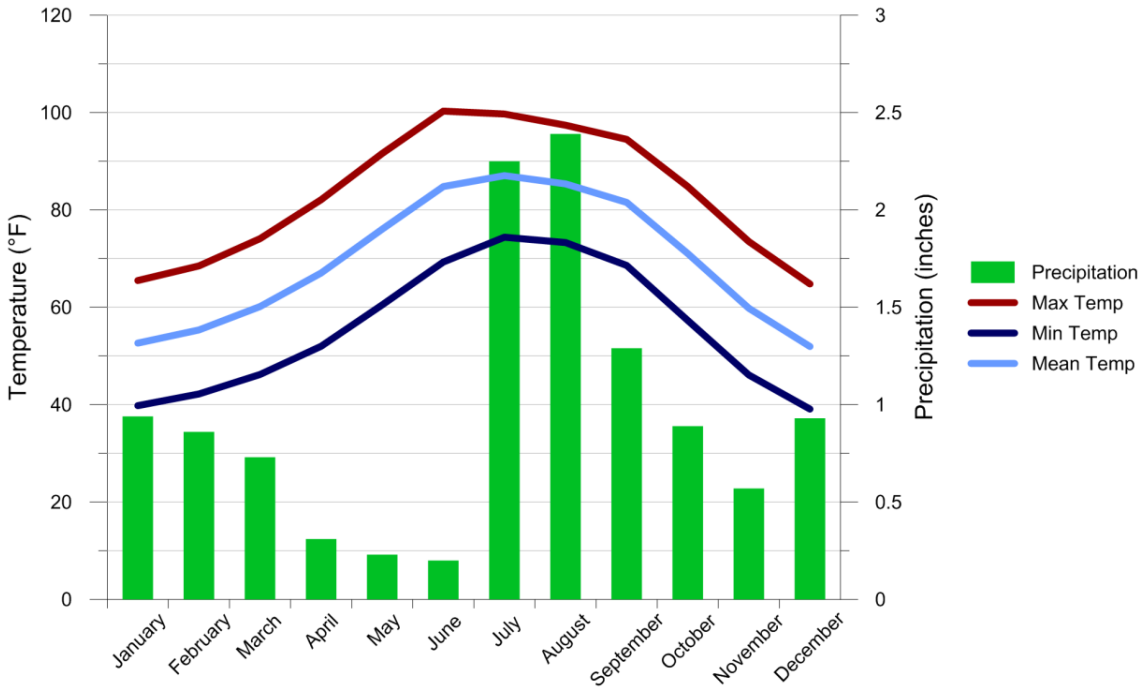

Figure 2-3. Average monthly temperatures and precipitation for Tucson, 1981–2010. Rillito does not have an official NWS climate site. The nearest NWS climate site is in Tucson, approximately 20 miles southeast of Rillito.

While windblown dust events in Arizona during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California and Arizona. These winds are the result of strong surface pressure gradients between the approaching low-pressure system (or cold front) and higher pressure ahead of it. As the low pressure system (or cold front) approaches and passes, gusty southwesterly winds typically shift to northwesterly. Gusty easterly winds can also develop in the Tucson/Rillito area when strong surface high pressure builds southward along the Rocky Mountains, resulting in a strong pressure gradient over Arizona. The strong winds can loft dust into the air and transport it over long distances, especially if soils in the region are dry.

2.4 Event Day Summary

On October 4, 2011, strong south-southwesterly winds generated by an approaching low-pressure system transported dust northeastward into Rillito (**Figure 2-4**). This system was located near the California/Arizona border early on October 4 and was forecast to generate strong winds and scattered thunderstorms across Arizona. The windblown dust resulted in a 24-hr average PM_{10} concentration of 171 µg/m^3 at the Rillito monitor (**Table 2-1**); this value is in exceedance of the NAAQS. The hourly and 24-hr average PM_{10} concentrations measured at the Rillito monitor were in excess of normal historical fluctuations. The dust was naturally occurring and likely originated over undeveloped lands southwest of Rillito outside the RNA. Wind gusts of up to 41 mph overwhelmed reasonable dust control measures. Other PM_{10}

monitors in southern Arizona also recorded 24-hr average PM_{10} concentrations in exceedance of the NAAQS on October 4, illustrating the regional nature of this event. In January 2013, ADEQ submitted to EPA exceptional event documentation regarding this event for two exceedance monitors in Maricopa County. In May 2013, EPA concurred with ADEQ's analysis demonstrating that those exceedances were due to windblown dust.

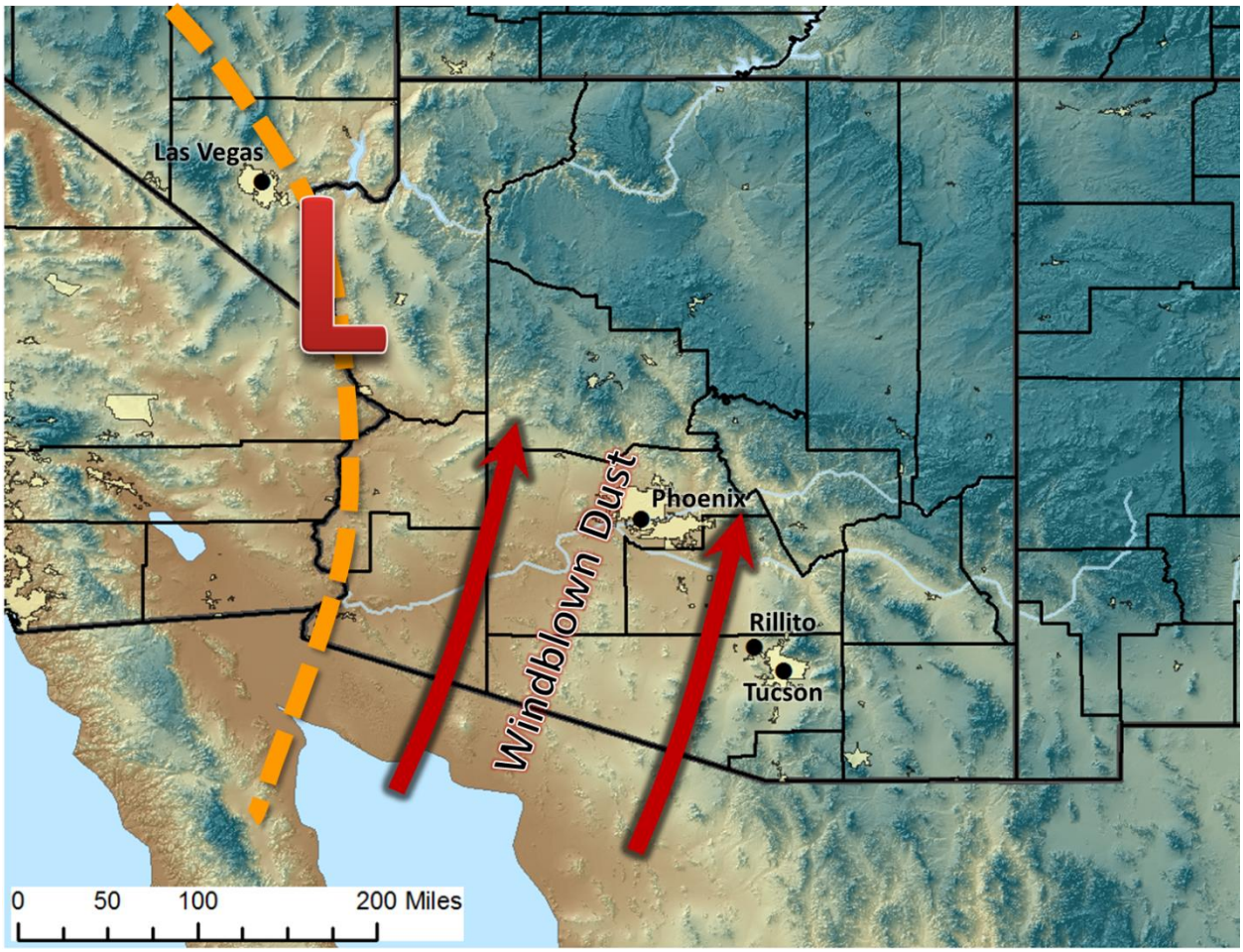

Figure 2-4. Strong southwesterly winds ahead of an approaching low-pressure system transported dust into the Rillito area on October 4, 2011.

Table 2-1. PM_{10} measurements collected in Arizona on October 4, 2011. Data from the Rillito monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Apache County							
N/A	TEOM	WMAT	04-001-1003-81102-1	12	54	2300	
Coconino County							
N/A	TEOM	NNIR	04-005-1237-81102-1	27	100	1500	
Gila County							
Hayden Old Jail	TEOM	ADEQ	04-007-1001-81102-3	123	719	1600	IJ
Maricopa County							
West Phoenix	TEOM	MCAQD	04-013-0019-81102-1	89	538	1300	
North Phoenix	GRAV	MCAQD	04-013-1004-81102-1	75	N/A	N/A	
North Phoenix	BAM	MCAQD	04-013-1004-81102-2	75	683	1300	
Glendale	TEOM	MCAQD	04-013-2001-81102-1	60	264	1200	
Central Phoenix	TEOM	MCAQD	04-013-3002-81102-4	106	835	1300	
Greenwood	TEOM	MCAQD	04-013-3010-81102-1	85	544	1300	
South Phoenix	TEOM	MCAQD	04-013-4003-81102-1	106	818	1300	
West Chandler	TEOM	MCAQD	04-013-4004-81102-1	252	2182	1400	RJ
Higley	TEOM	MCAQD	04-013-4006-81102-1	158	931	1300	RJ
West 43rd Ave	TEOM	MCAQD	04-013-4009-81102-1	83	503	1300	
Dysart	TEOM	MCAQD	04-013-4010-81102-1	39	134	1200	
Buckeye	TEOM	MCAQD	04-013-4011-81102-1	47	142	1700	
Zuni Hills	TEOM	MCAQD	04-013-4016-81102-1	33	101	1700	
Fort McDowell/Yuma Frank	TEOM	FMIR	04-013-5100-81102-3	108	N/A	N/A	
Durango Complex	TEOM	MCAQD	04-013-9812-81102-1	132	770	1300	
JLG Supersite	BAM	ADEQ	04-013-9997-81102-3	63	461	1300	IJ
JLG Supersite	TEOM	ADEQ	04-013-9997-81102-4	63	446	1300	IJ
Navajo County							
N/A	TEOM	WMAT	04-017-1002-81102-1	11	45	1400	
Pima County							
Ajo	TEOM	ADEQ	04-019-0001-81102-3	42	195	1200	
Orange Grove	GRAV	PCDEQ	04-019-0011-81102-2	30	N/A	N/A	
Rillito	**TEOM**	**ADEQ**	**04-019-0020-81102-3**	**171**	**1118**	**1400**	**RJ**
South Tucson	GRAV	PCDEQ	04-019-1001-81102-1	35	N/A	N/A	
Green Valley	TEOM	PCDEQ	04-019-1030-81102-1	76	514	1700	
Geronimo	TEOM	PCDEQ	04-019-1113-81102-1	30	78	1800	

Table 2-1. PM_{10} measurements collected in Arizona on October 4, 2011. Data from the Rillito monitor are shown in **bold green**.

Monitor	Monitor Type	Operator	AQS Monitor ID	24-hr Avg PM_{10} ($\mu g/m^3$)	1-hr Max PM_{10} ($\mu g/m^3$)	Time of Max 1-hr PM_{10} (MST)	AQS Qualifier Flag
Pinal County							
Casa Grande Downtown	TEOM	PCAQCD	04-021-0001-81102-3	215	N/A	N/A	RJ
Apache Junction Fire Station	TEOM	PCAQCD	04-021-3002-81102-3	115	N/A	N/A	
Stanfield	TEOM	PCAQCD	04-021-3008-81102-3	410	N/A	N/A	RJ
Combs	TEOM	PCAQCD	04-021-3009-81102-3	212	N/A	N/A	RJ
Maricopa	TEOM	PCAQCD	04-021-3010-81102-3	185	N/A	N/A	RJ
Pinal County Housing (aka Eleven Mile Corner)	TEOM	PCAQCD	04-021-3011-81102-3	575	N/A	N/A	RJ
Cowtown	TEOM	PCAQCD	04-021-3013-81102-3	271	N/A	N/A	RJ
Santa Cruz County							
Nogales Post Office	BAM	ADEQ	04-023-0004-81102-3	37	65	1300	
Yuma County							
Yuma Supersite	TEOM	ADEQ	04-027-8011-81102-3	71	221	1600	

TEOM: Tapered Element Oscillating Microbalance
GRAV: Gravimetric Analysis
BAM: Beta Attenuation Monitor
FRM: Federal Reference Method
WMAT: White Mountain Apache Tribe
ADEQ: Arizona Department of Environmental Quality
NPS: National Park Service
NNIR: Navajo Nation
MCAQD: Maricopa County Air Quality Department
FMIR: Fort McDowell Indian Reservation
SRPMIC: Salt River Pima-Maricopa Indian Community
HIR: Hualapai Indian Reservation
PCDEQ: Pima County Department of Environmental Quality
PCAQCD: Pinal County Air Quality Control District
GRIC: Gila River Indian Community
ICAPCD: Imperial County Air Pollution Control District
SCAQMD: South Coast Air Quality Management District
TMIR: Torres-Martinez Indian Reservation
MDAQMD: Mojave Desert Air Quality Management District
CCDAQEM: Clark County Department of Air Quality and Environmental Management
RJ: qualifier flag for high winds
IJ: qualifier flag for high winds
V: qualifier flag for a validated value

3. Causal Relationship

3.1 Discussion

Meteorological and air quality observations indicate that dust carried by strong south-southwesterly winds generated by an approaching low-pressure system was directly responsible for the high PM_{10} concentrations observed in Rillito on October 4, 2011 (**Figure 3-1**). PM_{10} concentrations peaked in the Rillito area between 12:00 and 16:00 MST on October 4, coincident with strong winds at collocated and nearby meteorological monitors (**Figures 3-2 and 3-3,** and Appendix B). The likely source region for PM_{10} during the October 4, 2011, event was the vast desert region southwest of Rillito; this region consists largely of natural, undisturbed desert. As noted in Section 2.1, soils along the I-10 corridor between Marana/Rillito and Casa Grande are particularly prone to lofting and transport by strong winds. Visibility was also impaired due to the blowing dust throughout the region (**Figure 3-4**).

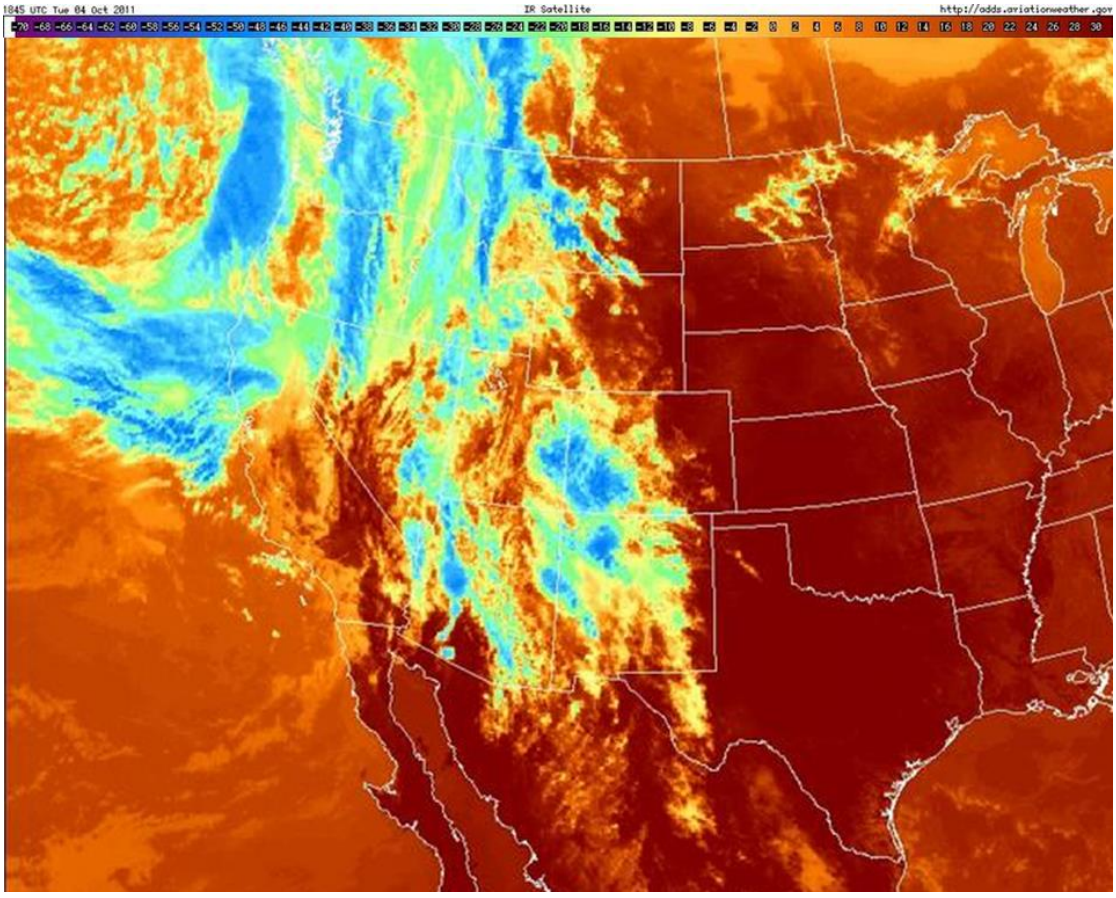

Figure 3-1. Infrared satellite image from 11:45 MST on October 4, 2011. A storm system located near Las Vegas, Nevada, produced areas of convection over Arizona. This system also generated strong south-southwesterly winds across southern Arizona. A second storm system was moving into northern California.

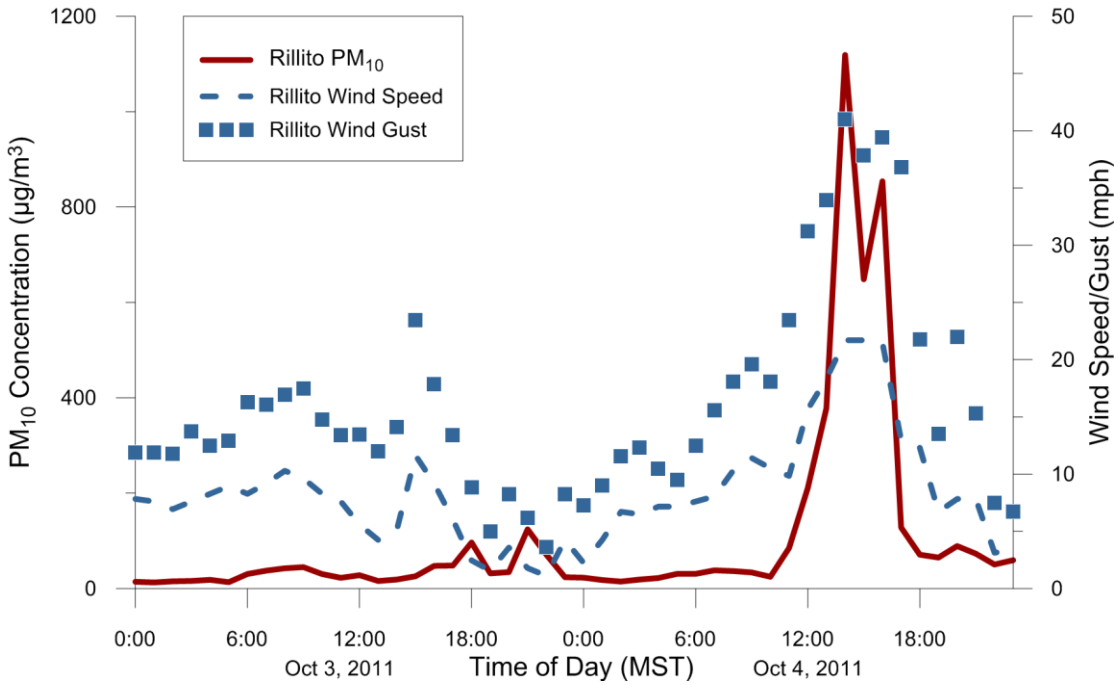

Figure 3-2. Hourly PM_{10} concentrations and wind speeds at the Rillito monitor on October 3 and 4, 2011. Strong winds and high PM_{10} concentrations were observed between 12:00 and 16:00 MST on October 4, indicating the presence of windblown dust.

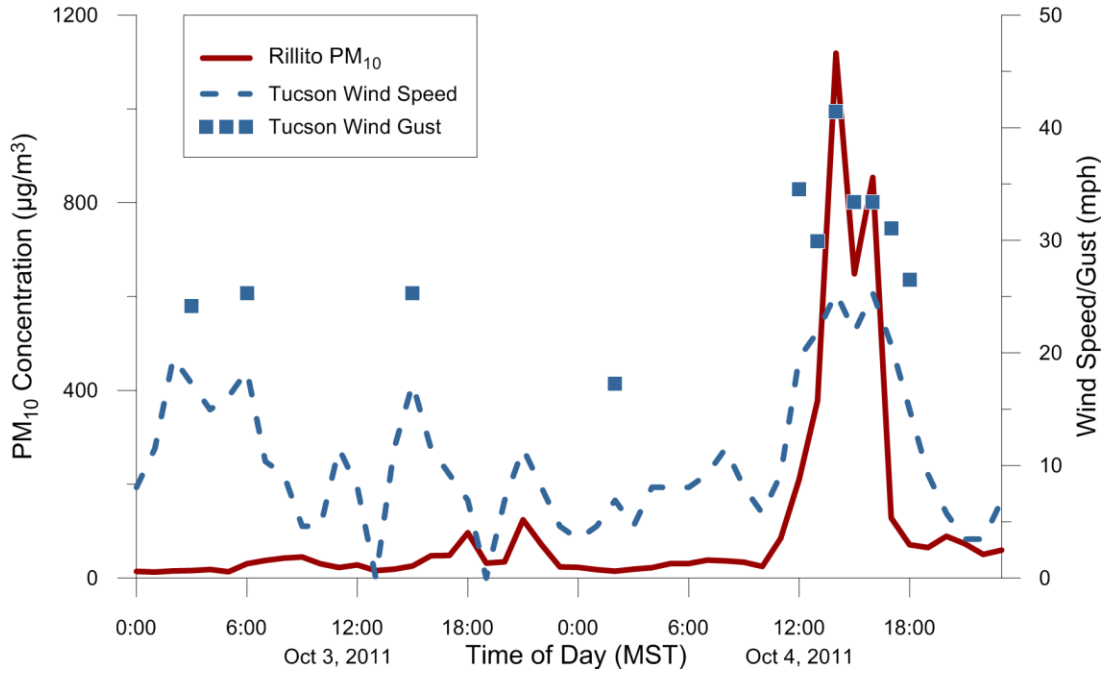

Figure 3-3. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at Tucson International Airport on October 3 and 4, 2011. Strong winds and high PM_{10} concentrations were observed between 12:00 and 16:00 MST on October 4, indicating the presence of windblown dust.

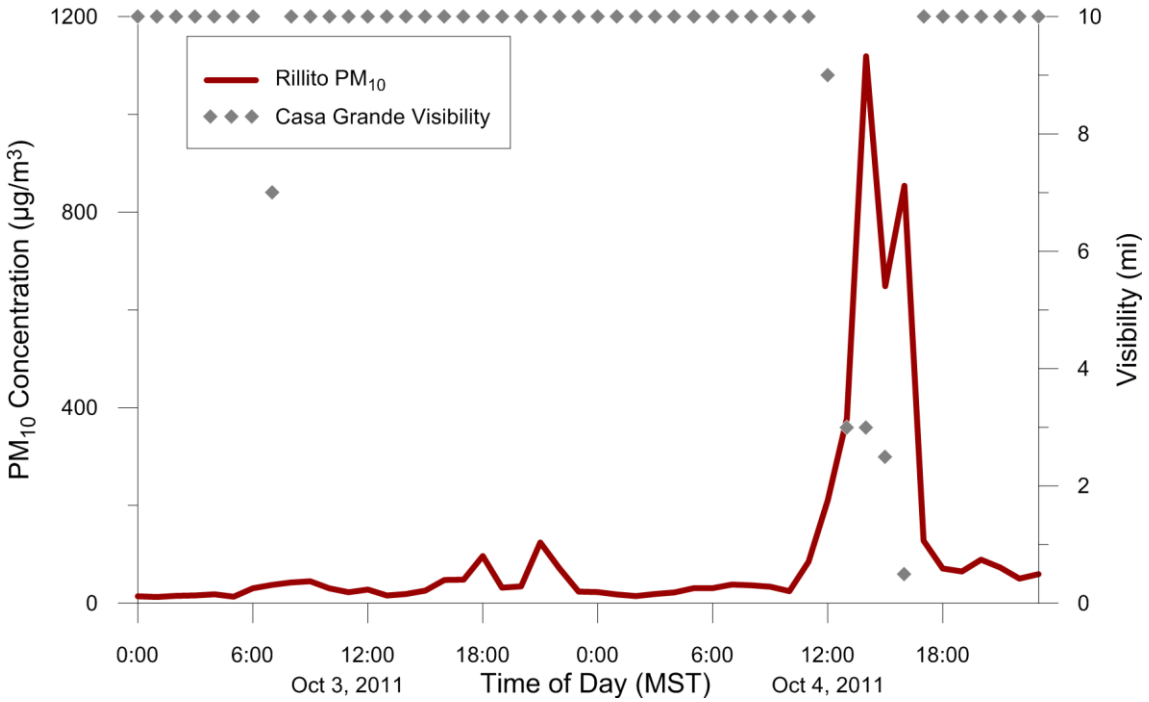

Figure 3-4. Hourly PM_{10} concentrations at the Rillito monitor and visibilities at Casa Grande Municipal Airport on October 3 and 4, 2011. Visibility was greatly reduced, coincident with the sharp increase in PM_{10} concentrations at the Rillito monitor, indicating the arrival of windblown dust. (Casa Grande is ~50 miles northwest of Rillito, but is the site of the nearest visibility sensor that was directly impacted by the windblown dust.)

Figures 3-5 through 3-7 illustrate wind, visibility, and PM_{10} data across Pima and Pinal counties before, during, and after the peak wind speeds and PM_{10} concentrations occurred. At 03:00 MST on October 4, wind speeds throughout the region were generally light from the southeast, PM_{10} concentrations were low, and visibilities were high (Figure 3-5). As the low-pressure system along the California/Arizona border moved eastward and strengthened, strong south-southwesterly winds developed throughout southern Arizona (Figure 3-6). The strong winds lofted and transported dust into the Rillito area, resulting in a 1-hr PM_{10} concentration of 1,119 µg/m^3 at 14:00 MST. PM_{10} concentrations above 1,000 µg/m^3 were reported at several other monitors in Pinal and southern Maricopa counties. In addition, visibilities were reduced in the areas with high PM_{10} concentrations. The NWS office in Tucson issued a Blowing Dust Advisory for the region due to the potential for wind gusts of up to 45 mph and visibilities below 1 mile. The windblown dust caused a severe traffic accident along I-10 in Pinal County (Appendix B). While south-southwesterly winds are favorable for transport of emissions from the nearby CalPortland cement plant to the Rillito monitor, the fact that strong winds, high PM_{10} concentrations, and low visibilities were observed regionwide indicates that the exceedance of the NAAQS recorded at the Rillito monitor was not directly attributable to local sources. South-southwesterly or southwesterly winds are also not favorable for transport of emissions from the Silver Bell Mine (located about 20 miles west of Rillito).

Winds quickly subsided across southern Arizona after 18:00 MST, and were calm to light northwesterly by 20:00 MST (Figure 3-7). With the lighter winds, PM_{10} concentrations

decreased and visibilities improved. A summary of area peak sustained winds and wind gusts measured at area monitors on October 4 is shown in **Table 3-1**. The low-pressure system generated areas of drizzle in and around Tucson, but low atmospheric humidity levels resulted in most precipitation evaporating before reaching the surface. As a result, only trace amounts of rain were reported. The precipitation was not sufficient enough to wet the ground and prevent lofting of the surface soils by the strong winds.

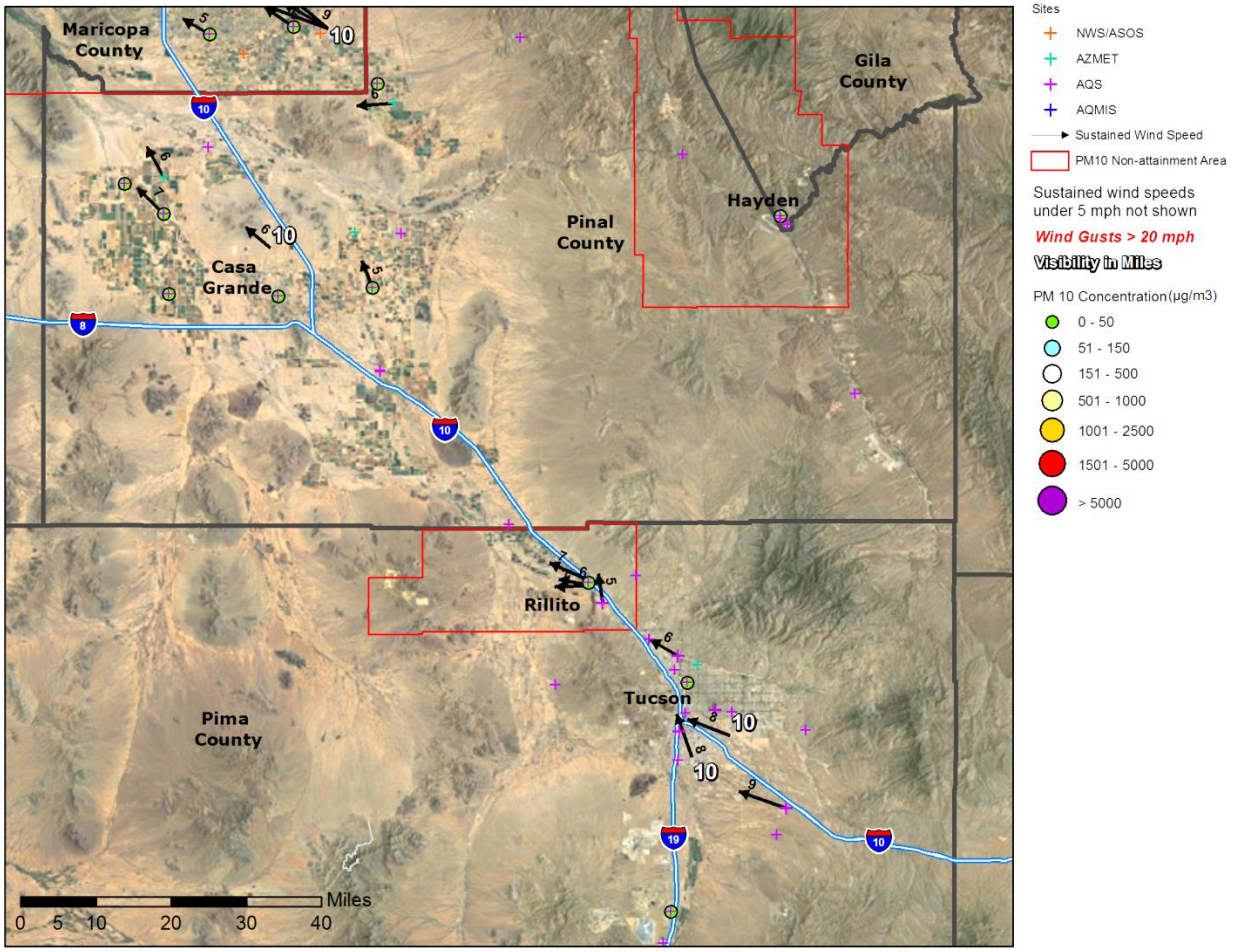

Figure 3-5. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 03:00 and 04:00 MST on October 4, 2011. Winds were generally light, PM_{10} concentrations were low, and visibilities were high throughout the region at this time.

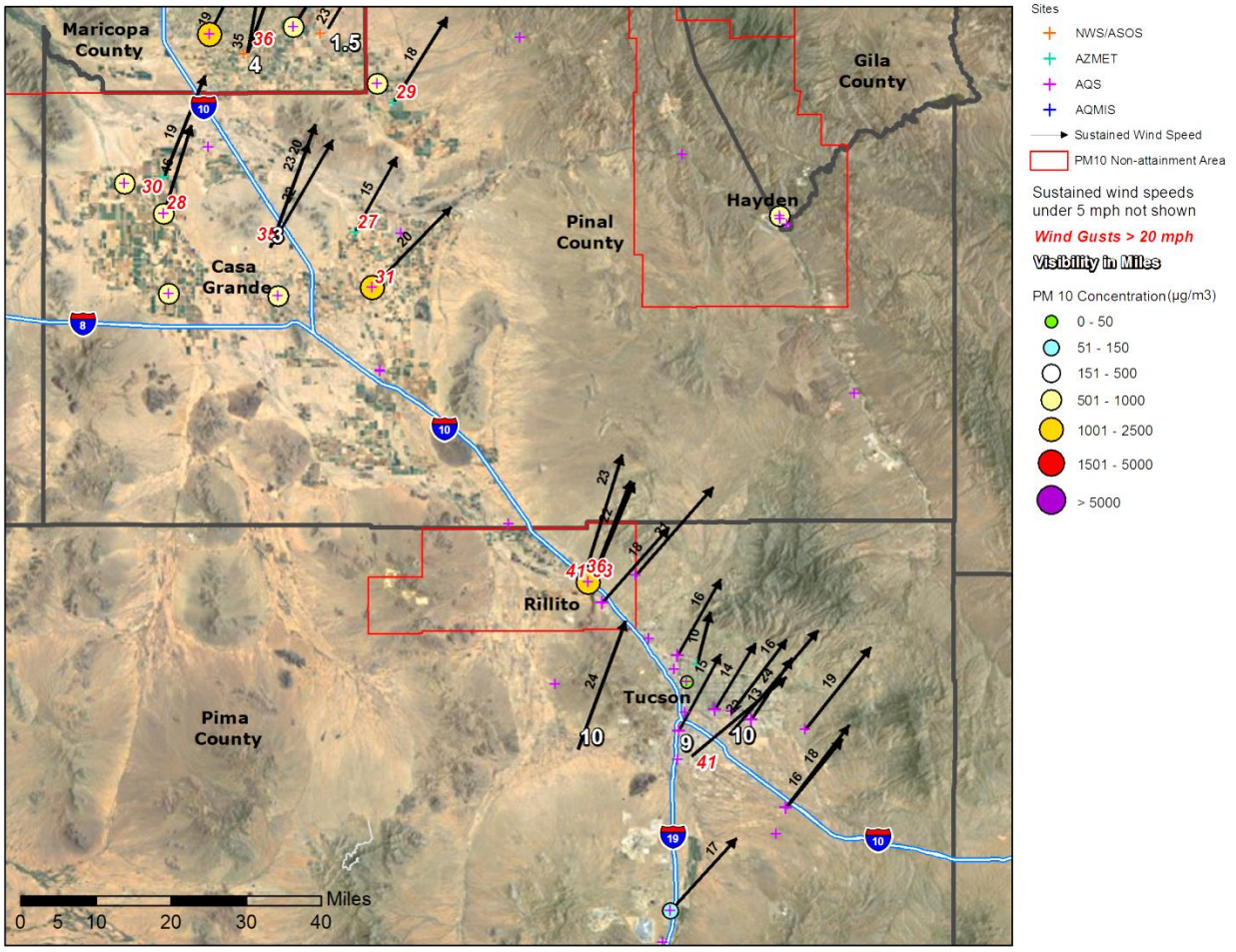

Figure 3-6. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 14:00 and 15:00 MST on October 4, 2011. Gusty south-southwesterly winds and high PM_{10} concentrations were reported regionwide. Visibilities were also reduced in regions north of Tucson, where soils are particularly susceptible to lofting by strong winds.

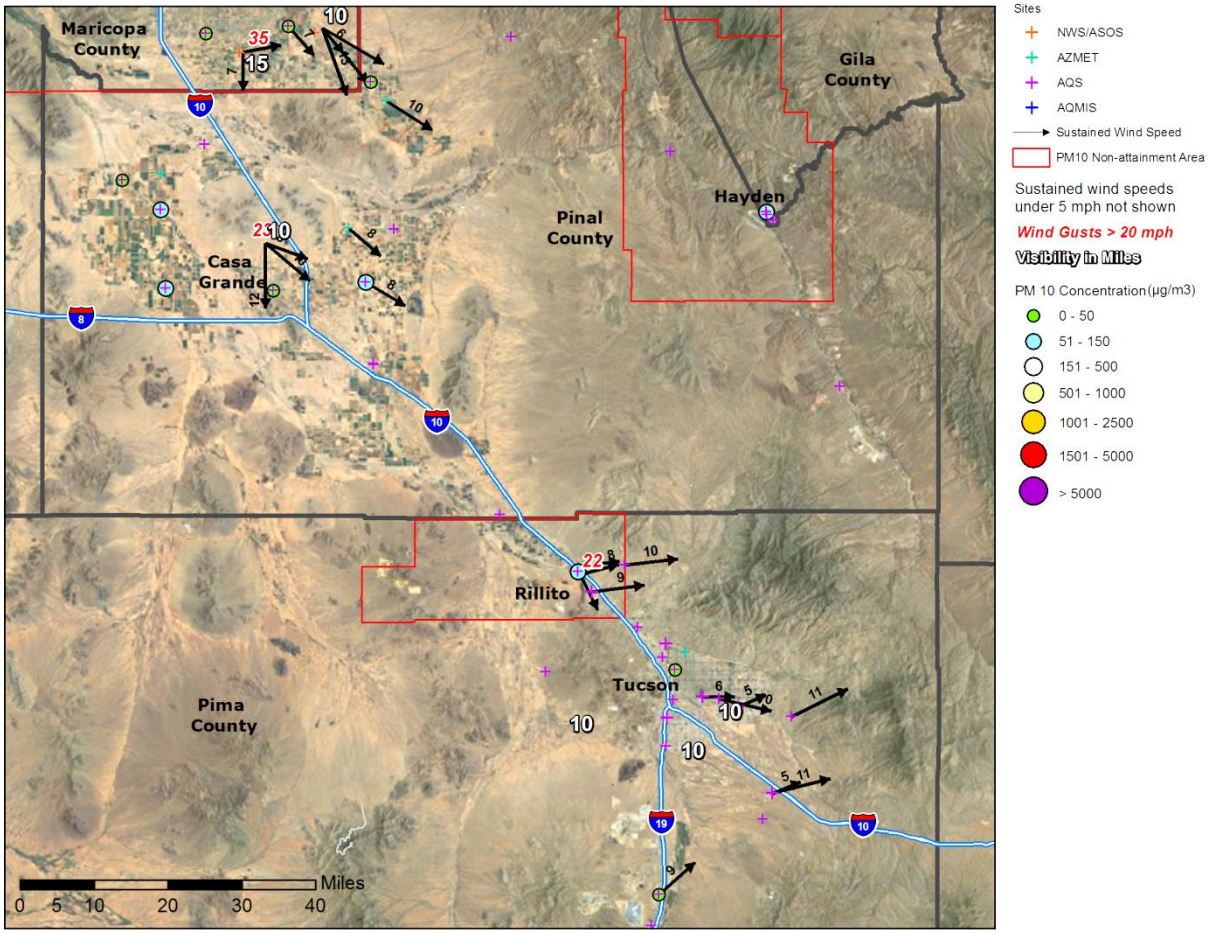

Figure 3-7. Hourly PM_{10} concentrations (colored circles), wind speed and direction (arrows), and minimum visibility (white numbers) observations at Pima and Pinal county monitors between 20:00 and 21:00 MST on October 4, 2011. Winds were much lighter regionwide, resulting in lower PM_{10} concentrations and improved visibilities.

Table 3-1. Peak observed wind speeds and wind gusts at Pima and Pinal county monitors on October 4, 2011. The Rillito monitor reported a 1-hr PM_{10} concentration of 1,119 µg/m^3 at 14:00 MST.

Monitor	Maximum Wind Speed (mph)	Wind Direction (degrees)	Time (MST)	Maximum Wind Gust (mph)	Time (MST)
Tucson Davis Monthan AFB	31	210	12:29	41	12:29
Tucson International Airport	25	200	13:53	41	13:53
Rillito	22	211	14:00	41	14:00
Marana	23	197	14:00	36	14:00
Tucson Ryan Field	30	220	15:45	36	15:45
Casa Grande	30	200	15:55	38	15:55

3.2 Summary

The information presented in this section demonstrates a clear causal relationship between the windblown dust and the PM_{10} exceedance measured at the Rillito monitor on October 4, 2011. The PM_{10} and wind data shown in this section illustrate the spatial and temporal representation of the windblown dust as it impacted Rillito. Strong south-southwesterly winds likely lofted large amounts of dust and PM_{10} into the lower atmosphere. This dust likely originated in open desert areas southwest of Rillito and was transported into Rillito by the strong winds. Strong winds and high PM_{10} concentrations were observed throughout southern Arizona, resulting in PM_{10} exceedances at several other monitors in Pinal and Maricopa counties. The time-series plots of air quality and meteorological data found in this section and in Appendix A show that the sharp increase in PM_{10} concentrations coincided with the onset of strong south-southwesterly winds. In addition, statements and advisories from the NWS office in Tucson reflect the hazardous dust storm conditions observed throughout the region.

4. Historical Norm

4.1 Analysis

PM_{10} concentrations measured at the Rillito monitor on October 4, 2011, were unusual and in excess of normal historical fluctuations. Time-series plots of the 24-hr average PM_{10} concentrations for the period January 1, 2007, through December 31, 2011, provide a historical perspective of PM_{10} concentrations at Rillito (**Figure 4-1**). The 24-hr average PM_{10} concentration on October 4, 2011, is one of the highest daily averages measured at Rillito during this five-year period. Please note that prior to April 1, 2010, the Rillito monitor operated on a one-in-six day schedule.

Historical daily cumulative distributions of the 24-hr average PM_{10} concentrations were created for the Rillito monitor for the same five-year data set to provide additional evidence in establishing the severity of this event. **Figure 4-2** shows a histogram of 24-hr average PM_{10} concentrations at the Rillito monitor and the corresponding 95th percentile. The 24-hr average PM_{10} concentration on October 4, 2011, was more than two times higher than the 95th percentile at the Rillito monitor. Concentrations in excess of the 95th percentile are considered to be unusual.[2]

4.2 Summary

Given the recorded values and using similar methodology to that accepted by EPA, it is clear that the PM_{10} concentrations observed at the Rillito monitor on October 4, 2011, were well above normal historical fluctuations. This analysis provides evidence that the event affected air quality on a historic scale.

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[2] Excluding days on which concentrations caused by exceptional events exceed the 95th percentile threshold employs a general test of statistical significance and has the effect of ensuring that such concentrations would clearly fall beyond the range of normal expectations for air quality during a particular time of year. Source: "The Treatment of Data Influenced by Exceptional Events," 71 FR 12598.

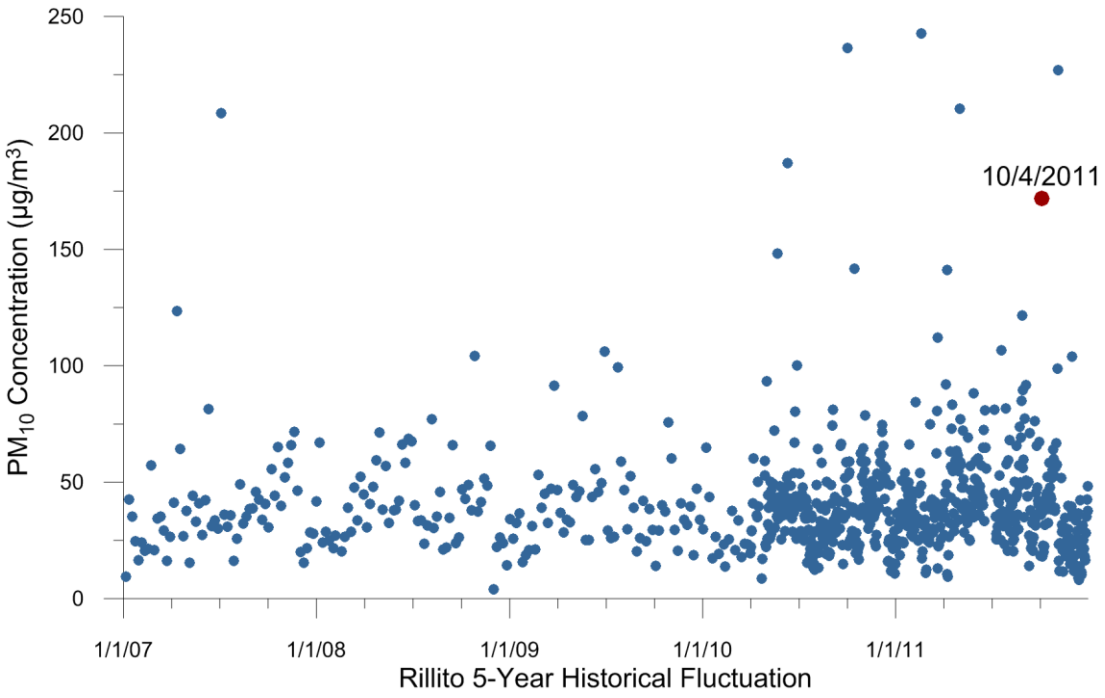


Figure 4-1. 24-hr average PM_{10} concentrations at the Rillito monitor (2007-2011). The 24-hr average PM_{10} concentration on October 4, 2011, is highlighted in red. Prior to April 1, 2010, the Rillito monitor operated on a one-in-six day schedule.

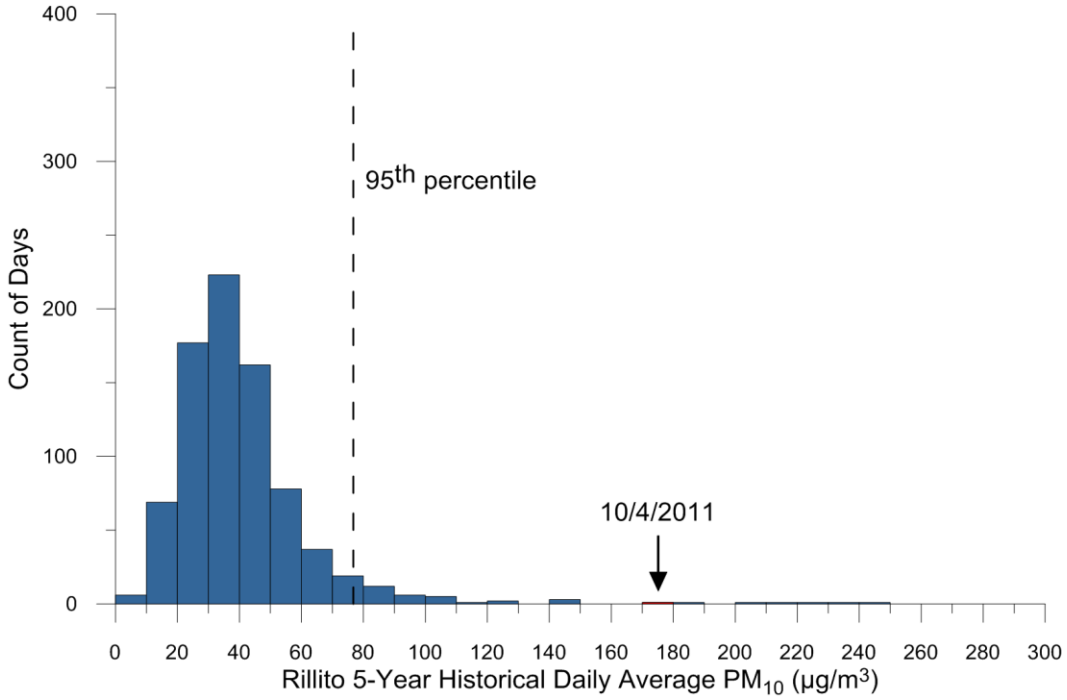


Figure 4-2. 24-hr average PM_{10} concentrations at the Rillito monitor (2007-2011). The 24-hr average PM_{10} concentration on October 4, 2011, was in excess of the 95th percentile. The value is also above the 95th percentile when considering only the continuous data since April 1, 2010.

5. Not Reasonably Controllable or Preventable

5.1 Background

Rillito was designated as a moderate PM_{10} nonattainment area by operation of the 1990 CAA. In 2006, following several years of improved air quality, EPA determined that the RNA had met the PM_{10} NAAQS and issued a clean data finding for the RNA. EPA's Clean Data Policy relieves the state of Arizona from certain demonstrations of attainment because qualifying for a clean data finding indicates that attainment has already been achieved. This section of the exceptional events demonstration describes the RACM implemented to bring the RNA into attainment and maintain attainment status.

5.1.1 Control Measures

Details of the RACM implemented in the RNA can be found in the *2008 RNA PM_{10} LMP and Request for Redesignation to Attainment*. The 1994 SIP submitted to EPA contained a series of control measures designed to mitigate PM_{10} emissions. Since then, the RNA has become more urbanized and less agricultural. Thus, some of the control measures included in the 1994 SIP have been discontinued or were one-time actions. **Table 5-1** provides the status of these measures.

Table 5-1. Status of control measures implemented in the RNA from the 1994 Rillito PM_{10} SIP.

Control Measure	Details	Current Status
1. CalPortland cement plant and quarry operations	Comprehensive road stabilization plan to mitigate emissions.	In effect, included in the CPC operating permit issued October 7, 2003
2. Pima County Grading Ordinance, Chapter 18.81 of the Pima County Zoning Code (January 2001)	Permits for earth moving require stabilization to mitigate fugitive emissions.	In effect
3. Bank stabilization of the Santa Cruz River	One-time control measure implemented in 1988 during the development of nearby residential neighborhoods.	Complete
4. Reduced tillage program	United States Department of Agriculture (DOA) pilot program.	Discontinued by U.S. DOA
5. Dust stabilization – Rillito community	Approximately one mile total of dirt road segments within the community are now paved.	Complete
6. Avra Valley road shoulder dust stabilization	Once per year, 2.5 miles of road shoulders undergo blading and rolling, followed by application of magnesium chloride.	In effect on an as-needed basis

The implementation of these control measures helped bring the RNA into timely attainment of the 24-hr standard; thus, the measures meet the CAA requirement for RACM for moderate PM_{10} nonattainment areas. In addition to these RACM, the Arizona Department of Transportation's (ADOT) Standard Specification Section 810 mandates that state contractors use a comprehensive series of control measures designed to mitigate airborne PM_{10} emissions during road construction projects.

5.1.2 Permanent and Enforceable Control Measures

The CAA requires that all types of maintenance plans demonstrate that measures credited with bringing an area into attainment are federally enforceable and continue into the future. Measures 1, 2, and 6 in Table 5-1 meet these requirements. Measure 4 was discontinued by the U.S. DOA and was not replaced, and measures 3 and 5 are no longer necessary because the affected public roadways have since been paved.

New major emissions sources or major modifications to existing sources in nonattainment areas are subject to AAC R18-2-403 (*Permits for Sources Located in Nonattainment Areas*). After an area is redesignated, AAC R18-2-406 (*Permit Requirements for Sources Located in Attainment and Unclassifiable Areas*) will apply for any major source(s) within the maintenance area.

5.1.3 Contingency Measures

Section 175A of the CAA requires a maintenance plan's contingency provisions to be enacted should a violation of the PM_{10} standard occur following redesignation to attainment. EPA's memo, *Limited Maintenance Plan Option for Moderate PM_{10} Nonattainment Areas* (Lydia Wegman, August 9, 2001),[3] states that contingency measures do not have to be fully adopted at the time of redesignation, but that the LMP should identify measures to be implemented if necessary.

The state commits to act promptly if an exceedance of the area's design value occurs following redesignation to attainment. Specifically, the state commits to determine that an exceedance has occurred within six months of the end of the calendar year in which that exceedance occurred. The state also commits to identify and implement the appropriate control measure(s) needed to remedy the situation by the end of the same calendar year.

A redesignated area with an LMP is also required to annually recalculate the average design value for the area to determine whether the area has continued to qualify for an LMP. If, after performing the annual recalculation, the state determines that the area no longer qualifies for an LMP, the state will commit to take actions to reduce PM_{10} concentrations sufficiently to requalify for an LMP, or will prepare a Maintenance Plan.

[3] The EPA memo regarding the LMP option for Moderate PM_{10} Nonattainment Areas can be found at http://www.epa.gov/ttn/oarpg/t1/memoranda/lmp_final.pdf.

5.1.4 Contingency Measure Trigger

The state will consider implementing the contingency measures featured in **Table 5-2** should an exceedance of the critical design value (CDV) occur. In order to prevent an exceedance from occurring, ADEQ opted to identify a specific indicator, or trigger, if PM_{10} concentrations reach a level that signals an imminent exceedance. The trigger will be used by ADEQ to determine the need to implement contingency measures in order to prevent an exceedance.

Table 5-2. Rillito area contingency control measures.

Contingency Control Measure	Implementing Entity
1. If any PM_{10} generating source within the maintenance area is found to be contributing to monitored readings above the LMP allowable limits, ADEQ will review existing air quality permits and/or applicable rules to identify additional control measures that may be needed. If a PM_{10} source does not have a permit, ADEQ will determine whether a permit and PM_{10} controls are needed.	ADEQ
2. Review and revise dust control measures for material storage piles to determine whether additional action is needed.	ADEQ
3. Pave any new unpaved public roads, vacant lots, and unpaved parking lots located in the PM_{10} maintenance area subject to limits of statutory authority.	Pima County
4. Review and, if necessary, revise existing grading ordinances.	Pima County
5. Reduce PM by paving or stabilizing unpaved or unimproved shoulders and alleys.	Pima County and Town of Marana
6. Review and, if necessary, revise standards for installation and maintenance of landscaping and screening.	Pima County
7. Review and, if necessary, revise roadway maintenance practices following exceptional events.	Pima County

Per the LMP submitted in 2008, contingency measures will be considered if ambient concentrations reach 95% of the CDV. The current CDV for the RNA is 135 $\mu g/m^3$. The causes that activated the trigger will help the state to determine the appropriate contingency measure(s) to be implemented. ADEQ believes that identifying a trigger, although not required, will increase protection of public health and help assure that the area continues to qualify for an LMP.

5.1.5 Conformity

The Transportation Conformity Rule (40 CFR Parts 51 and 93) and General Conformity Rule (58 FR 63214; November 30, 1993) apply to nonattainment areas and maintenance areas operating under maintenance plans. Under transportation conformity rules, one way to demonstrate conformity is to indicate that expected emissions from planned actions are

consistent with the emissions budget for the area. Emissions budgets in LMP areas can be treated as essentially non-constraining for the length of the maintenance period because it is unreasonable to expect that an LMP area would experience so much growth during that period of time that a violation of the PM_{10} NAAQS would result. This does not exempt an LMP area from the need to affirm conformity, but it does allow the area to demonstrate conformity without following certain requirements. For transportation conformity purposes, EPA would most likely conclude that emissions in these areas do not require a cap for the duration of the maintenance period and, therefore, that a regional emissions analysis will not be required.

General conformity requires that non-transportation-based projects in areas that have nonattainment or maintenance plans submit a description of the project to the state. The description must show either that the project will not increase the relevant emissions for the area, or that specific control measures will be applied for the duration of the project in order to prevent increased emissions.

5.1.6 Review of Source-Permitted Inspections and Public Complaints

ADEQ's Arizona Unified Repository for Information Tracking of the Environment (AZURITE) database was queried to compile a list of inspections for the permitted sources in the Rillito area around the time of the October 4, 2011, PM_{10} exceedance. An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions.

5.2 Forecasts and Warnings

Dust forecasts were released prior to the event by both ADEQ and the NWS office in Phoenix (Appendix B). The ADEQ dust control forecast issued on Monday, October 3, 2011, indicated that south-southwesterly winds of 15-25 mph with gusts to 30 mph and areas of dense blowing dust were possible on October 4. The NWS office in Tucson issued Short Term Forecasts and a Blowing Dust Advisory for Pima and Pinal counties, including Rillito. These statements warned of the potential for wind gusts of up to 45 mph with visibilities below 1 mile due to blowing dust.

5.3 Wind Observations

Sustained wind speeds of up to 22 mph and wind gusts of up to 41 mph were reported at the Rillito monitor during this windblown dust event. Monitors at Casa Grande, Davis-Monthan AFB, and Tucson Ryan Field reported sustained winds of at least 30 mph. Winds of over 25 mph are normally sufficient to overcome most PM_{10} control measures. As was noted in Section 2.1, soils in the region between Marana/Rillito and Casa Grande are particularly prone to lofting by winds.

5.4 Summary

The weather forecasts and observations outlined in this section demonstrate that strong south-southwesterly winds caused uncontrollable PM_{10} emissions in the Rillito area. The RACM

outlined in the Rillito PM_{10} Maintenance Plan were in place at the time of the event. These control measures are required for areas designated as Moderate nonattainment for PM_{10}, such as Rillito. Thus, the RACM in place at the time of the event were reasonable. In addition, surface wind measurements in the Rillito area during the event were high enough (wind gusts of up to 41 mph) that most reasonable PM_{10} control measures would have been overwhelmed.

6. But-For Analysis

6.1 Discussion

Section 50.14(c)(3)(iv)(D) in 40 CFR Part 50 requires that an exceptional event demonstration satisfies that "[t]here would have been no exceedance or violation but for the event." The prior sections of this submittal have provided detailed information that, in regard to the PM_{10} exceedance at the Rillito monitor on October 4, 2011,

- The exceedance was not reasonably controllable or preventable, and
- There was a clear causal relationship between PM_{10} transported by strong south-southwesterly winds originating in desert areas outside the RNA and the measured PM_{10} exceedance in Rillito.

The weight of evidence in these sections demonstrates that, but for the existence of dust emissions generated by strong south-southwesterly winds ahead of a low-pressure system and the associated transport of PM_{10}, there would have been no exceedance of the NAAQS for 24-hr average PM_{10}.

As shown in Section 3, time-series plots of PM_{10} and wind speeds establish a clear causal relationship between the arrival of dust-laden winds and high PM_{10} concentrations at the Rillito monitor. Multiple independent measurements of wind speed, wind direction, and visibility all point to the presence of south-southwesterly winds as the mechanism for transport of PM_{10} into the RNA. High PM_{10} concentrations and gusty winds were also reported in other parts of Arizona, illustrating the widespread nature of this event. In addition, PM_{10} concentrations were well below the NAAQS on days immediately before and after this windblown dust event. The source regions for the PM_{10} are clearly identified as open desert southwest of the RNA. The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of October 4, 2011, to any causal source except PM_{10} transported by south-southwesterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

As detailed in Section 5, all reasonable control measures were in place and/or implemented on a continual basis. Air quality-related inspection and compliance data revealed no violations or complaints within three days before and after the time of the event. Local regulatory agencies, industry, and the general public were alerted to the possibility of dust storms due to strong winds ahead of an approaching low-pressure system via daily forecasts and media reports.

6.2 Summary

The weight of evidence presented in this submittal provides no alternative that could tie the exceedance of October 4, 2011, to any causal source except PM_{10} transported by strong south-southwesterly winds, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

7. Conclusions

The PM_{10} exceedance that occurred on October 4, 2011, satisfies the criteria of the EER, which states that in order to justify the exclusion of air quality monitoring data, evidence must be provided for the following elements:

1. The event satisfies the criteria set forth in 40 CFR 50.1(j) that
    a. the event affected air quality,
    b. the event was not reasonably controllable or preventable, and
    c. the event was caused by human activity unlikely to recur in a particular location or was a natural event;
2. There is a clear causal relationship between the measurement(s) under consideration and the event;
3. The event is associated with a measured concentration(s) in excess of normal historical fluctuations; and
4. There would have been no exceedance or violation but for the event.

7.1 Affects Air Quality

As stated in the preamble to the EER, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in Sections 2, 3, 4, and 5, we can reasonably conclude that the event in question affected air quality.

7.2 Not Reasonably Controllable or Preventable

Section 50.1(j) of 40 CFR Part 50 requires that an event must be “not reasonably controllable or preventable” in order to be defined as an exceptional event. This requirement is met by demonstrating that, despite reasonable control measures in place within the RNA, high winds overwhelmed all reasonably available controls. The PM_{10} exceedance discussed in this report was caused by naturally occurring south-southwesterly winds that transported dust into Rillito from areas largely outside the RNA. These facts provide strong evidence that the PM_{10} exceedance on October 4, 2011, was not reasonably controllable or preventable.

7.3 Natural Event

As discussed above, the PM_{10} exceedance in Rillito on October 4, 2011, was shown to be caused by transport of PM_{10} into Rillito by strong south-southwesterly winds ahead of an approaching low-pressure system. The event therefore qualifies as a natural event.

7.4 Clear Causal Relationship

The following points demonstrate that the high PM_{10} concentrations were caused by windblown dust:

- Time-series plots of PM_{10} concentrations show that the timing of high PM_{10} at the Rillito monitor was consistent with strong winds and low visibilities at Rillito-area meteorological stations (Section 3).
- High PM_{10} concentrations and strong winds were reported at other monitors in southern Arizona, illustrating the regional, uncontrollable nature of this event (Section 3).
- PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event (Section 3).
- Soils in the region are particularly susceptible to lofting and transport by strong winds (Sections 2 and 3).

7.5 Historical Norm

The 24-hr average PM_{10} values measured at the Rillito monitor were historically unusual compared to a multi-year data set (Section 4).

7.6 But For

On the basis of the weight of evidence described above and in Section 6, the exceedance of the federal 24-hr PM_{10} standard on October 4, 2011, at the Rillito monitor would not have occurred but for the period of strong south-southwesterly winds that transported dust from open desert areas southwest of Rillito into the RNA.

Appendix A:
Air Quality and Meteorological Data for the Rillito Area

This section contains time-series plots of air quality and meteorological data for Rillito and other regional monitors October 3 and 4, 2011. The data illustrate the increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in the immediate Rillito area.

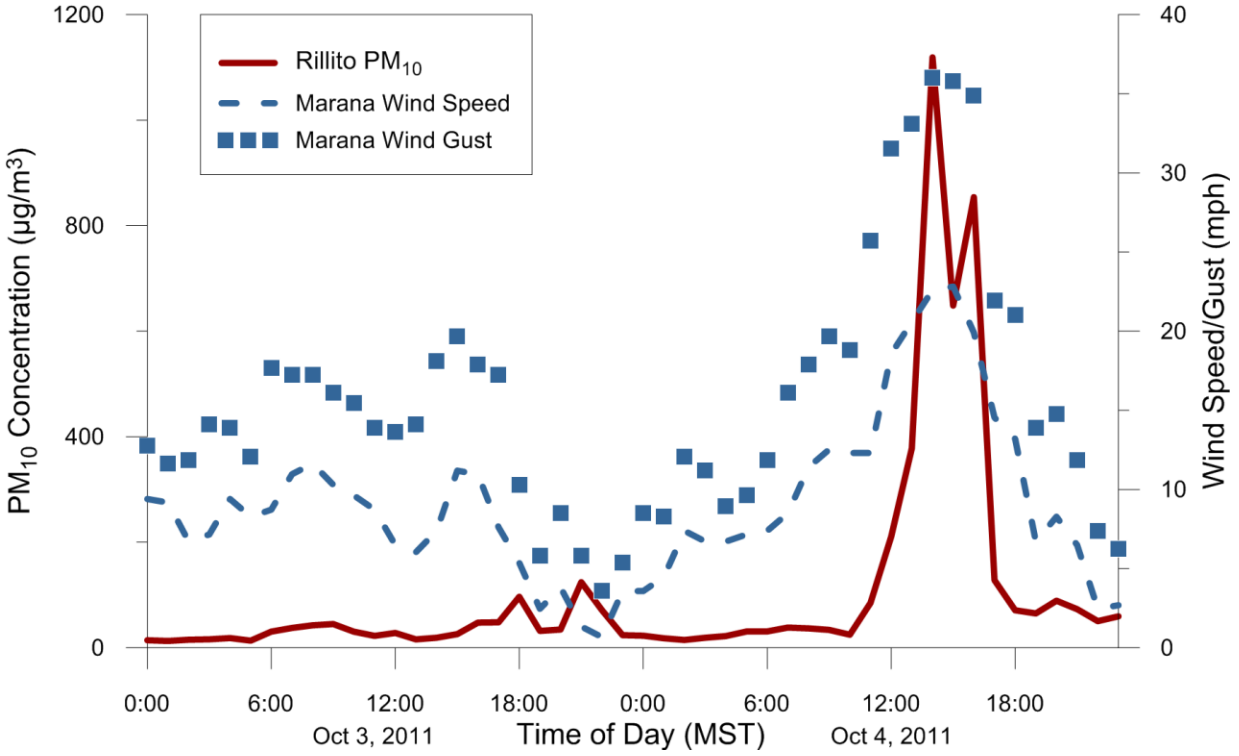


Figure A-1. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at the Marana monitor on October 3 and 4, 2011. PM_{10} concentrations and wind speeds sharply increased at 12:00 MST on October 4, indicating the arrival of windblown dust.

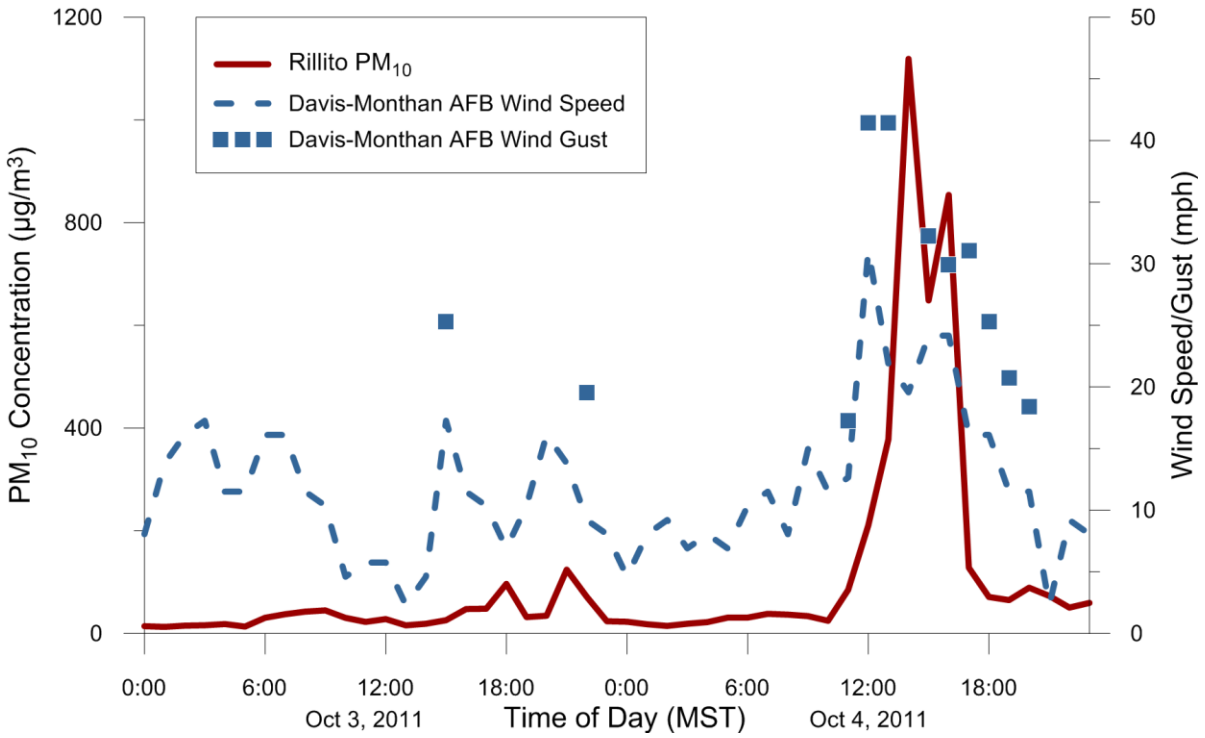


Figure A-2. Hourly PM_{10} concentrations at the Rillito monitor and wind speeds at Davis-Monthan AFB on October 3 and 4, 2011. PM_{10} concentrations and wind speeds sharply increased at 12:00 MST on October 4, indicating the arrival of windblown dust.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
TUCSON INTERNATIONAL AIRPORT (23160)
TUCSON, AZ (10/03/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2549 ft. above sea level
Latitude: 32.131
Longitude: -110.955
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0053	11	CLR	10.00		75	23.9	62	16.8	54	12.2	48	11	130		27.38			29.91	AA		30.05
03	0153	11	CLR	10.00		76	24.4	62	16.4	52	11.1	43	20	130		27.37			29.90	AA		30.04
03	0253	11	CLR	10.00		75	23.9	61	16.2	52	11.1	45	17	120	24	27.37			29.90	AA		30.04
03	0353	11	SCT110	10.00		74	23.3	61	16.0	52	11.1	46	15	120		27.37			29.90	AA		30.04
03	0453	11	CLR	10.00		73	22.8	61	15.8	52	11.1	48	16	120		27.36			29.90	AA		30.03
03	0553	11	CLR	10.00		74	23.3	61	16.0	52	11.1	46	18	130	25	27.37			29.91	AA		30.04
03	0653	11	CLR	10.00		72	22.2	60	15.6	52	11.1	50	10	140		27.39			29.93	AA		30.06
03	0753	11	CLR	10.00		76	24.4	62	16.7	53	11.7	45	9	130		27.40			29.96	AA		30.08
03	0853	11	CLR	10.00		79	26.1	63	17.3	53	11.7	41	5	090		27.41			29.96	AA		30.09
03	0953	11	CLR	10.00		82	27.8	64	17.6	52	11.1	35	5	VR		27.41			29.96	AA		30.09
03	1053	11	CLR	10.00		86	30.0	65	18.0	51	10.6	30	11	160		27.39			29.93	AA		30.07
03	1153	11	CLR	10.00		88	31.1	65	18.1	50	10.0	27	8	190		27.38			29.91	AA		30.05
03	1253	11	CLR	10.00		90	32.2	65	18.0	48	8.9	24	0	000		27.34			29.87	AA		30.01
03	1353	11	SCT110	10.00		91	32.8	64	17.7	46	7.8	21	0	000		27.31			29.83	AA		29.98
03	1407	11	FEW110	10.00	VCTS	91	33.0	64	17.7	46	8.0	21	9	210		27.31			M	SP		29.98
03	1422	11	CLR	10.00		90	32.0	63	17.3	45	7.0	21	11	220		27.30			M	SP		29.97
03	1453	11	FEW110	10.00		91	32.8	63	17.1	43	6.1	19	0	000		27.30			29.83	AA		29.97
03	1518	11	BKN110	10.00		86	30.0	64	17.8	50	10.0	29	17	090	25	27.29			M	SP		29.96
03	1553	11	BKN110	10.00		87	30.6	64	17.5	48	8.9	26	11	110		27.29			29.82	AA		29.96
03	1653	11	FEW120	10.00		86	30.0	64	17.8	50	10.0	29	9	040		27.28			29.81	AA		29.95
03	1753	11	CLR	10.00		86	30.0	64	17.5	49	9.4	28	7	060		27.27			29.81	AA		29.94
03	1853	11	BKN120	10.00		85	29.4	63	17.1	48	8.9	28	0	000		27.29			29.82	AA		29.96
03	1953	11	CLR	10.00		83	28.3	62	16.7	48	8.9	30	7	120		27.30			29.83	AA		29.97
03	2053	11	CLR	10.00		81	27.2	62	16.9	50	10.0	34	11	120		27.31			29.85	AA		29.98
03	2153	11	FEW110	10.00		80	26.7	62	16.7	50	10.0	35	8	130		27.33			29.86	AA		30.00
03	2253	11	SCT110	10.00		79	26.1	62	16.7	51	10.6	38	5	150		27.33			29.85	AA		30.00
03	2353	11	BKN100	10.00		78	25.6	61	16.3	50	10.0	38	3	160		27.33			29.85	AA		30.00

Figure A-3. Quality-controlled local climatological data hourly observations table for Tucson International Airport, Tucson, Arizona (10/03/2011). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
TUCSON INTERNATIONAL AIRPORT (23160)
TUCSON, AZ (10/04/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2549 ft. above sea level
Latitude: 32.131
Longitude: -110.955
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0053	11	OVC100	10.00		79	26.1	60	15.5	46	7.8	31	5	180		27.34			29.85	AA		30.01
04	0153	11	BKN100 OVC110	10.00	-RA	77	25.0	61	16.1	50	10.0	39	7	VR	17	27.33			29.85	AA	T	30.00
04	0253	11	CLR	10.00		75	23.9	59	15.2	48	8.9	39	5	100		27.31			29.83	AA		29.98
04	0353	11	CLR	10.00		72	22.2	60	15.6	52	11.1	50	8	160		27.31			29.84	AA		29.98
04	0453	11	FEW110	10.00		69	20.6	60	15.3	53	11.7	57	8	160		27.31			29.85	AA		29.98
04	0553	11	CLR	10.00		69	20.6	59	14.7	51	10.6	53	8	120		27.32			29.86	AA		29.99
04	0653	11	CLR	10.00		69	20.6	59	15.0	52	11.1	55	9	120		27.32			29.87	AA		29.99
04	0753	11	CLR	10.00		72	22.2	60	15.3	51	10.6	48	11	120		27.33			29.87	AA		30.00
04	0853	11	CLR	10.00		77	25.0	61	15.8	49	9.4	37	8	180		27.33			29.86	AA		30.00
04	0953	11	CLR	10.00		80	26.7	62	16.7	50	10.0	35	6	170		27.31			29.84	AA		29.98
04	1053	11	CLR	10.00		85	29.4	62	16.4	45	7.2	25	9	180		27.29			29.82	AA		29.96
04	1153	11	SCT110	10.00		86	30.0	60	15.3	39	3.9	19	20	200	34	27.27			29.80	AA		29.94
04	1253	11	FEW100	10.00		88	31.1	61	15.9	40	4.4	18	22	210	30	27.24			29.75	AA	T	29.90
04	1353	11	FEW019	9.00		88	31.1	61	15.9	40	4.4	18	25	200	41	27.21			29.72	AA		29.87
04	1453	11	FEW110	10.00		89	31.7	61	16.3	41	5.0	19	22	230	33	27.19			29.70	AA		29.85
04	1553	11	FEW100	10.00		87	30.6	61	16.1	42	5.6	21	25	220	33	27.17			29.69	AA		29.83
04	1653	11	CLR	10.00		84	28.9	61	16.2	45	7.2	26	21	240	31	27.18			29.71	AA		29.84
04	1753	11	CLR	10.00		80	26.7	60	15.4	45	7.2	29	15	240	26	27.20			29.74	AA		29.86
04	1853	11	CLR	10.00		78	25.6	58	14.4	42	5.6	28	9	230		27.24			29.78	AA		29.90
04	1953	11	CLR	10.00		74	23.3	56	13.1	40	4.4	29	6	220		27.26			29.80	AA		29.92
04	2053	11	CLR	10.00		72	22.2	56	13.6	44	6.7	37	3	250		27.27			29.81	AA		29.93
04	2153	11	CLR	10.00		70	21.1	57	13.6	46	7.8	42	3	230		27.27			29.82	AA		29.94
04	2253	11	CLR	10.00		66	18.9	57	14.1	51	10.6	59	7	360		27.28			29.83	AA		29.95
04	2353	11	CLR	10.00		66	18.9	56	13.2	48	8.9	52	3	050		27.28			29.83	AA		29.95

Figure A-4. Quality-controlled local climatological data hourly observations table for Tucson International Airport, Tucson, Arizona (10/04/2011). Strong south-southwesterly winds were reported during the afternoon hours with a brief reduction in visibility. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
DAVIS-MONTHAN AFB AIRPORT (23109)
TUCSON, AZ (10/03/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 2704 ft. above sea level
Latitude: 32.166
Longitude: -110.883
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0058	0	CLR	10.00		75	24.1	62	16.5	53	11.7	46	14	140		27.21			30.27	AA		30.03
03	0158	0	CLR	10.00		74	23.2	61	16.3	53	11.4	48	16	120		27.20			30.25	AA		30.02
03	0258	0	CLR	10.00		73	22.7	61	15.8	52	11.3	48	17	140		27.20			30.25	AA		30.02
03	0358	0	BKN120	10.00		73	22.6	60	15.5	51	10.7	46	11	130		27.20			30.25	AA		30.02
03	0458	0	CLR	10.00		71	21.4	60	15.4	52	11.1	51	11	120		27.20			30.26	AA		30.02
03	0559	0	CLR	10.00		72	22.1	60	15.6	52	11.1	50	16	140		27.20			30.26	AA		30.02
03	0658	0	CLR	10.00		73	22.5	61	15.8	52	11.2	48	16	130		27.23			30.29	AA		30.05
03	0758	0	CLR	10.00		74	23.3	61	16.3	53	11.6	48	11	140		27.24			30.31	AA		30.06
03	0858	0	CLR	10.00		79	26.2	63	17.0	52	11.1	39	10	120		27.25			30.33	AA		30.07
03	0958	0	CLR	10.00		83	28.1	64	17.5	51	10.6	33	5	180		27.25			30.33	AA		30.07
03	1058	0	CLR	10.00		84	28.9	64	17.7	51	10.5	32	6	160		27.23			30.31	AA		30.05
03	1158	0	CLR	10.00		87	30.7	65	18.2	51	10.4	29	6	VR		27.21			30.30	AA		30.03
03	1258	0	CLR	10.00		88	30.9	64	17.9	49	9.7	26	2	VR		27.18			30.27	AA		30.00
03	1358	0	CLR	10.00		91	32.8	64	17.7	46	7.6	21	5	VR		27.15			30.24	AA		29.96
03	1442	0	BKN100	10.00		90	32.0	66	19.0	52	11.0	27	14	140	20	27.15			M	AA		29.96
03	1448	0	OVC100	10.00		86	30.0	65	18.3	52	11.0	31	17	090		27.14			M	AA		29.95
03	1458	0	BKN100	10.00		84	29.0	65	18.4	54	12.0	36	15	100	25	27.14			30.22	AA		29.95
03	1558	0	FEW120	10.00		85	29.5	64	17.8	51	10.5	31	11	090		27.13			30.20	AA		29.94
03	1658	0	CLR	10.00		85	29.3	64	17.8	51	10.5	31	10	040		27.12			30.20	AA		29.93
03	1758	0	CLR	10.00		84	28.8	64	17.6	51	10.5	32	7	060		27.12			30.20	AA		29.93
03	1858	0	BKN140	10.00		83	28.4	63	17.0	49	9.6	31	10	110		27.13			30.20	AA		29.94
03	1958	0	BKN120 OVC150	10.00		82	27.7	62	16.8	49	9.4	32	16	110		27.14			30.21	AA		29.95
03	2058	0	BKN150	10.00		80	26.7	62	16.6	50	9.9	35	14	110		27.16			30.22	AA		29.97
03	2158	0	BKN110 OVC130	10.00		79	26.1	62	16.5	50	10.2	36	9	140	20	27.16			30.23	AA		29.98
03	2258	0	OVC110	10.00		78	25.5	62	16.5	51	10.5	39	8	140		27.16			30.22	AA		29.98
03	2358	0	BKN110 BKN130 OVC160	10.00		77	25.2	60	15.3	47	8.2	35	5	150		27.17			30.23	AA		29.99

Figure A-5. Quality-controlled local climatological data hourly observations table for Davis-Monthan AFB, Tucson, Arizona (10/03/2011). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

LOCAL CLIMATOLOGICAL DATA (final)
DAVIS-MONTHAN AFB AIRPORT (23109)
TUCSON, AZ (10/04/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0058	0	OVC100	10.00		77	25.2	60	15.3	47	8.2	35	6	150		27.17			30.23	AA		29.99
04	0107	0	OVC100	10.00	-DZ	77	25.0	59	15.1	46	8.0	33	8	140		27.17			M	AA	T	29.99
04	0121	0	OVC100	10.00		77	25.0	60	15.6	48	9.0	36	6	160		27.17			M	AA	T	29.99
04	0132	0	BKN100	10.00	-DZ	77	25.0	60	15.6	48	9.0	36	3	190		27.17			M	AA	T	29.99
04	0142	0	BKN100	10.00		75	24.0	60	15.7	50	10.0	42	7	170		27.18			M	AA	T	30.00
04	0144	0	BKN100	10.00	DZ	75	24.0	60	15.7	50	10.0	42	8	160		27.18			M	AA	T	30.00
04	0158	0	FEW070 BKN100	10.00	-RA	76	24.5	60	15.4	48	8.9	37	9	120		27.17			30.22	AA	T	29.99
04	0219	0	FEW070 SCT140	10.00		75	24.0	61	16.2	52	11.0	45	8	090		27.16			M	AA	T	29.97
04	0258	0	FEW140	10.00		74	23.1	61	16.3	53	11.5	48	7	080		27.15			30.20	AA	T	29.96
04	0358	0	CLR	10.00		71	21.4	61	16.0	54	12.1	55	8	110		27.15			30.19	AA		29.96
04	0458	0	FEW120	10.00		70	21.3	59	15.2	52	11.2	53	7	130		27.15			30.19	AA		29.96
04	0559	0	SCT110	10.00		70	20.9	59	14.9	51	10.6	51	10	140		27.16			30.20	AA		29.97
04	0658	0	SCT110 SCT130	10.00		69	20.8	59	14.7	51	10.8	53	11	140		27.16			30.22	AA		29.98
04	0758	0	CLR	10.00		72	22.2	60	15.3	51	10.7	48	8	160		27.16			30.22	AA		29.98
04	0858	0	CLR	10.00		79	25.9	61	16.2	49	9.7	35	15	120		27.16			30.22	AA		29.97
04	0958	0	CLR	10.00		83	28.3	62	16.7	48	8.8	30	11	120		27.14			30.21	AA		29.95
04	1039	0	FEW200	10.00	-RA	84	29.0	60	15.8	43	6.0	24	8	150		27.14			M	AA	T	29.95
04	1049	0	CLR	10.00		84	29.0	60	15.8	43	6.0	24	13	160	17	27.13			M	AA	T	29.94
04	1058	0	CLR	10.00		84	29.1	60	15.5	42	5.5	23	10	180		27.13			30.20	AA	T	29.94
04	1158	0	FEW200	10.00		85	29.3	60	15.7	42	5.3	22	16	180	26	27.11			30.18	AA		29.92
04	1201	0	FEW200	10.00		84	29.0	60	15.8	43	6.0	24	16	210	24	27.11			M	AA	T	29.92
04	1224	0	FEW110	10.00	-DZ	84	29.0	60	15.3	41	5.0	22	21	200	30	27.09			M	AA	T	29.90
04	1229	0	FEW100	9.00	-DZ	84	29.0	60	15.8	43	6.0	24	31	170	41	27.11			M	AA	T	29.92
04	1240	0	FEW110	10.00		82	28.0	60	15.4	43	6.0	25	9	200	41	27.09			M	AA	T	29.90
04	1258	0	CLR	10.00		86	30.1	61	16.1	43	6.1	22	22	190	24	27.08			30.15	AA	T	29.89
04	1358	0	FEW100 SCT130	10.00		86	30.1	61	15.9	42	5.3	21	20	180		27.04			30.11	AA		29.85
04	1458	0	SCT100	10.00		87	30.4	61	16.1	42	5.5	21	24	220	32	27.02			30.09	AA		29.82
04	1558	0	FEW100	10.00		86	30.1	62	16.3	44	6.5	23	24	230	30	27.01			30.08	AA		29.81
04	1658	0	FEW100	10.00		84	29.0	62	16.4	46	7.5	27	16	230	31	27.02			30.09	AA		29.82
04	1758	0	CLR	10.00		80	26.9	60	15.6	46	7.6	30	16	240	25	27.04			30.11	AA		29.85
04	1858	0	CLR	10.00		78	25.3	58	14.3	42	5.8	28	11	250	21	27.07			30.14	AA		29.88
04	1958	0	CLR	10.00		75	23.9	56	13.3	40	4.6	28	11	250	18	27.09			30.15	AA		29.90
04	2058	0	CLR	10.00		73	22.6	56	13.5	43	6.3	34	2	230		27.11			30.16	AA		29.92
04	2158	0	FEW090	10.00		71	21.9	57	13.8	46	7.5	41	9	240		27.11			30.16	AA		29.92
04	2258	0	CLR	10.00		66	18.7	57	13.8	50	9.9	57	8	310		27.12			30.16	AA		29.93
04	2358	0	SCT060	10.00		65	18.1	56	13.3	49	9.6	56	2	300		27.13			30.17	AA		29.94

Figure A-6. Quality-controlled local climatological data hourly observations table for Davis-Monthan AFB, Tucson, Arizona (10/04/2011). Strong south-southwesterly winds were reported during the afternoon hours with a brief reduction in visibility. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
CASA GRANDE MUNICIPAL ARPT (03914)
CASA GRANDE, AZ (10/03/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1462 ft. above sea level
Latitude: 32.95
Longitude: -111.766
Data Version: VER2

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
03	0015	0	CLR	10.00		81	27.0	62	16.5	48	9.0	32	8	100		28.39			M	AA		29.94
03	0035	0	CLR	10.00		81	27.0	62	16.5	48	9.0	32	8	080		28.39			M	AA		29.94
03	0055	0	CLR	10.00		81	27.0	63	17.0	50	10.0	34	6	100		28.39			M	AA		29.94
03	0115	0	CLR	10.00		81	27.0	64	17.5	52	11.0	37	7	100		28.39			M	AA		29.94
03	0135	0	CLR	10.00		79	26.0	62	16.6	50	10.0	36	6	080		28.39			M	AA		29.94
03	0155	0	CLR	10.00		79	26.0	62	16.6	50	10.0	36	7	080		28.39			M	AA		29.94
03	0215	0	CLR	10.00		79	26.0	62	16.6	50	10.0	36	7	090		28.38			M	AA		29.93
03	0235	0	CLR	10.00		79	26.0	62	16.6	50	10.0	36	6	100		28.38			M	AA		29.93
03	0255	0	CLR	10.00		75	24.0	60	15.3	48	9.0	39	0	000		28.38			M	AA		29.93
03	0315	0	CLR	10.00		75	24.0	59	14.8	46	8.0	36	3	040		28.38			M	AA		29.93
03	0335	0	CLR	10.00		75	24.0	59	14.8	46	8.0	36	0	000		28.38			M	AA		29.93
03	0355	0	CLR	10.00		77	25.0	60	15.7	48	9.0	36	5	100		28.38			M	AA		29.93
03	0415	0	CLR	10.00		77	25.0	60	15.7	48	9.0	36	7	090		28.38			M	AA		29.93
03	0435	0	CLR	10.00		77	25.0	60	15.7	48	9.0	36	9	090		28.38			M	AA		29.93
03	0455	0	CLR	10.00		77	25.0	60	15.7	48	9.0	36	6	090		28.39			M	AA		29.94
03	0515	0	CLR	10.00		75	24.0	60	15.3	48	9.0	39	7	070		28.39			M	AA		29.94
03	0535	0	CLR	10.00		75	24.0	60	15.3	48	9.0	39	9	080		28.40			M	AA		29.95
03	0555	0	CLR	10.00		75	24.0	60	15.3	48	9.0	39	9	070		28.40			M	AA		29.95
03	0615	0	CLR	10.00		73	23.0	59	14.9	48	9.0	41	7	060		28.40			M	AA		29.95
03	0635	0	CLR	7.00		75	24.0	60	15.8	50	10.0	42	8	070		28.40			M	AA		29.95
03	0655	0	CLR	10.00		77	25.0	61	16.2	50	10.0	39	8	120		28.41			M	AA		29.96
03	0715	0	CLR	10.00		79	26.0	62	16.6	50	10.0	36	11	080		28.41			M	AA		29.96
03	0735	0	CLR	10.00		79	26.0	63	17.1	52	11.0	39	13	080		28.42			M	AA		29.97
03	0755	0	CLR	10.00		81	27.0	63	17.0	50	10.0	34	9	090		28.42			M	AA		29.97
03	0815	0	CLR	10.00		81	27.0	64	17.5	52	11.0	37	9	070		28.43			M	AA		29.98
03	0835	0	CLR	10.00		82	28.0	63	17.2	50	10.0	33	7	100		28.43			M	AA		29.98
03	0855	0	CLR	10.00		81	27.0	64	17.5	52	11.0	37	7	130		28.43			M	AA		29.98
03	0915	0	CLR	10.00		81	27.0	64	17.5	52	11.0	37	5	130		28.44			M	AA		29.99
03	0935	0	CLR	10.00		82	28.0	64	17.7	52	11.0	35	7	100		28.44			M	AA		29.99
03	0955	0	CLR	10.00		84	29.0	65	18.1	52	11.0	33	9	110		28.43			M	AA		29.98
03	1015	0	CLR	10.00		88	31.0	66	18.8	52	11.0	29	9	140		28.43			M	AA		29.98
03	1035	0	CLR	10.00		90	32.0	67	19.1	52	11.0	27	10	160		28.42			M	AA		29.97
03	1055	0	CLR	10.00		90	32.0	67	19.1	52	11.0	27	8	110		28.42			M	AA		29.97
03	1115	0	CLR	10.00		91	33.0	67	19.3	52	11.0	26	9	170		28.41			M	AA		29.96
03	1135	0	CLR	10.00		91	33.0	67	19.3	52	11.0	26	9	150		28.40			M	AA		29.95

03	1155	0	CLR	10.00		91	33.0	66	18.8	50	10.0	25	7	180		28.40			M	AA		29.95
03	1215	0	CLR	10.00		93	34.0	67	19.2	50	10.0	23	10	190	23	28.38			M	AA		29.93
03	1235	0	CLR	10.00		93	34.0	66	18.7	48	9.0	21	6	140		28.38			M	AA		29.93
03	1255	0	CLR	10.00		93	34.0	66	18.7	48	9.0	21	0	000		28.36			M	AA		29.91
03	1315	0	CLR	10.00		93	34.0	66	18.7	48	9.0	21	3	140		28.35			M	AA		29.90
03	1335	0	CLR	10.00		95	35.0	66	19.1	48	9.0	20	10	180		28.34			M	AA		29.89
03	1355	0	FEW110	10.00		97	36.0	67	19.4	48	9.0	19	7	160	16	28.33			M	AA		29.88
03	1415	0	FEW110	10.00		95	35.0	66	18.6	46	8.0	19	10	200		28.32			M	AA		29.87
03	1435	0	CLR	10.00		95	35.0	66	18.6	46	8.0	19	11	190	16	28.31			M	AA		29.86
03	1455	0	FEW120	10.00		93	34.0	65	18.3	46	8.0	20	5	150		28.30			M	AA		29.85
03	1515	0	CLR	10.00		97	36.0	66	19.0	46	8.0	17	11	180	24	28.30			M	AA		29.85
03	1535	0	CLR	10.00		97	36.0	66	18.8	45	7.0	17	15	220	21	28.29			M	AA		29.84
03	1555	0	CLR	10.00		97	36.0	66	18.8	45	7.0	17	20	190	25	28.29			M	AA		29.84
03	1615	0	CLR	10.00		97	36.0	65	18.4	43	6.0	16	14	210	20	28.29			M	AA		29.84
03	1635	0	CLR	10.00		97	36.0	65	18.4	43	6.0	16	14	210		28.28			M	AA		29.83
03	1655	0	CLR	10.00		95	35.0	64	18.0	43	6.0	17	10	210	20	28.28			M	AA		29.83
03	1715	0	CLR	10.00		95	35.0	64	18.0	43	6.0	17	13	190		28.28			M	AA		29.83
03	1735	0	CLR	10.00		93	34.0	64	17.6	43	6.0	18	10	200		28.28			M	AA		29.83
03	1755	0	CLR	10.00		93	34.0	63	17.2	41	5.0	16	9	210		28.29			M	AA		29.84
03	1815	0	CLR	10.00		91	33.0	62	16.5	39	4.0	16	11	210		28.29			M	AA		29.84
03	1835	0	CLR	10.00		90	32.0	61	16.3	39	4.0	17	10	220		28.30			M	AA		29.85
03	1855	0	CLR	10.00		88	31.0	61	15.9	39	4.0	18	8	220		28.30			M	AA		29.85
03	1915	0	CLR	10.00		86	30.0	60	15.5	39	4.0	19	7	230		28.30			M	AA		29.85
03	1935	0	CLR	10.00		84	29.0	59	15.1	39	4.0	20	6	220		28.30			M	AA		29.85
03	1955	0	CLR	10.00		84	29.0	59	15.1	39	4.0	20	5	220		28.31			M	AA		29.86
03	2015	0	CLR	10.00		82	28.0	59	14.7	39	4.0	22	5	230		28.31			M	AA		29.86
03	2035	0	CLR	10.00		81	27.0	58	14.5	39	4.0	22	0	000		28.32			M	AA		29.87
03	2055	0	CLR	10.00		79	26.0	57	13.7	37	3.0	22	0	000		28.32			M	AA		29.87
03	2115	0	CLR	10.00		82	28.0	59	14.7	39	4.0	22	0	000		28.32			M	AA		29.87
03	2135	0	CLR	10.00		79	26.0	57	13.7	37	3.0	22	0	000		28.33			M	AA		29.88
03	2155	0	CLR	10.00		79	26.0	57	13.7	37	3.0	22	0	000		28.33			M	AA		29.88
03	2215	0	CLR	10.00		77	25.0	56	13.3	37	3.0	24	0	000		28.34			M	AA		29.89
03	2235	0	CLR	10.00		79	26.0	57	14.1	39	4.0	24	0	000		28.34			M	AA		29.89
03	2255	0	CLR	10.00		79	26.0	57	14.1	39	4.0	24	3	080		28.34			M	AA		29.89
03	2315	0	CLR	10.00		79	26.0	57	14.1	39	4.0	24	0	000		28.34			M	AA		29.89
03	2335	0	FEW120	10.00		79	26.0	57	14.1	39	4.0	24	0	000		28.34			M	AA		29.89
03	2355	0	SCT120	10.00		81	27.0	58	14.5	39	4.0	22	7	100		28.34			M	AA		29.89

Figure A-7. Quality-controlled local climatological data hourly observations table for Casa Grande Municipal Airport, Casa Grande, Arizona (10/03/2011). Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final)
HOURLY OBSERVATIONS TABLE
CASA GRANDE MUNICIPAL ARPT (03914)
CASA GRANDE, AZ (10/04/2011)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 1462 ft. above sea level
Latitude: 32.95
Longitude: -111.766
Data Version: VER2

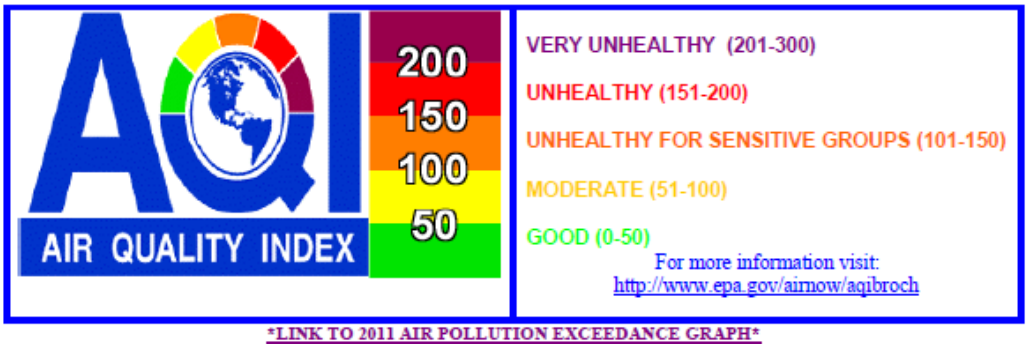
Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
04	0015	0	BKN120	10.00		81	27.0	59	14.9	41	5.0	24	8	100		28.34			M	AA		29.89
04	0035	0	BKN120	10.00		81	27.0	60	15.3	43	6.0	26	7	110		28.34			M	AA		29.89
04	0055	0	BKN120	10.00		81	27.0	59	14.9	41	5.0	24	8	110		28.34			M	AA		29.89
04	0115	0	BKN120	10.00		81	27.0	59	14.9	41	5.0	24	7	130		28.33			M	AA		29.88
04	0135	0	FEW120	10.00		81	27.0	58	14.5	39	4.0	22	8	120		28.33			M	AA		29.88
04	0155	0	CLR	10.00		81	27.0	58	14.5	39	4.0	22	6	120		28.32			M	AA		29.87
04	0215	0	FEW120	10.00		81	27.0	59	14.9	41	5.0	24	6	120		28.32			M	AA		29.87
04	0235	0	FEW120	10.00		81	27.0	59	14.9	41	5.0	24	6	130		28.32			M	AA		29.87
04	0255	0	FEW120	10.00		81	27.0	60	15.3	43	6.0	26	6	120		28.32			M	AA		29.87
04	0315	0	FEW120	10.00		81	27.0	60	15.3	43	6.0	26	6	130		28.32			M	AA		29.87
04	0335	0	CLR	10.00		79	26.0	59	14.9	43	6.0	28	5	180		28.32			M	AA		29.87
04	0355	0	CLR	10.00		77	25.0	58	14.5	43	6.0	30	0	000		28.32			M	AA		29.87
04	0415	0	CLR	10.00		75	24.0	57	14.1	43	6.0	32	0	000		28.32			M	AA		29.87
04	0435	0	CLR	10.00		75	24.0	57	14.1	43	6.0	32	5	140		28.32			M	AA		29.87
04	0455	0	CLR	10.00		73	23.0	57	13.6	43	6.0	34	5	260		28.32			M	AA		29.87
04	0515	0	CLR	10.00		72	22.0	55	13.0	41	5.0	33	6	220		28.32			M	AA		29.87
04	0535	0	CLR	10.00		72	22.0	56	13.4	43	6.0	35	6	190		28.33			M	AA		29.88
04	0555	0	CLR	10.00		72	22.0	55	13.0	41	5.0	33	0	000		28.33			M	AA		29.88
04	0615	0	CLR	10.00		70	21.0	55	12.5	41	5.0	35	0	000		28.34			M	AA		29.89
04	0635	0	CLR	10.00		68	20.0	53	11.6	39	4.0	35	0	000		28.34			M	AA		29.89
04	0655	0	CLR	10.00		70	21.0	54	12.1	39	4.0	32	0	000		28.34			M	AA		29.89
04	0715	0	CLR	10.00		72	22.0	55	13.0	41	5.0	33	0	000		28.34			M	AA		29.89
04	0735	0	CLR	10.00		75	24.0	57	14.1	43	6.0	32	3	050		28.33			M	AA		29.88
04	0755	0	CLR	10.00		77	25.0	58	14.5	43	6.0	30	5	110		28.33			M	AA		29.88
04	0815	0	CLR	10.00		81	27.0	61	16.0	46	8.0	29	13	140		28.33			M	AA		29.88
04	0835	0	CLR	10.00		81	27.0	61	16.0	46	8.0	29	11	150		28.34			M	AA		29.89
04	0855	0	CLR	10.00		82	28.0	61	16.2	46	8.0	28	11	130		28.33			M	AA		29.88
04	0915	0	CLR	10.00		84	29.0	62	16.6	46	8.0	27	11	130		28.33			M	AA		29.88
04	0935	0	CLR	10.00		84	29.0	62	16.4	45	7.0	26	11	150		28.32			M	AA		29.87
04	0955	0	CLR	10.00		86	30.0	62	16.8	45	7.0	24	11	180		28.32			M	AA		29.87
04	1015	0	CLR	10.00		86	30.0	62	16.8	45	7.0	24	14	170		28.32			M	AA		29.87
04	1035	0	CLR	10.00		88	31.0	63	17.1	45	7.0	22	9	200		28.31			M	AA		29.86
04	1055	0	CLR	10.00		86	30.0	62	16.8	45	7.0	24	9	210		28.30			M	AA		29.85
04	1115	0	CLR	10.00		88	31.0	63	17.1	45	7.0	22	8	200		28.30			M	AA		29.85

04	1135	0	CLR	10.00		88	31.0	63	17.1	45	7.0	22	7	180		28.28			M	AA		29.83
04	1155	0	CLR	10.00		90	32.0	64	17.5	45	7.0	21	15	190		28.27			M	AA		29.82
04	1215	0	CLR	9.00		91	33.0	64	17.7	45	7.0	20	22	190	30	28.27			M	AA		29.81
04	1235	0	CLR	9.00		91	33.0	64	17.7	45	7.0	20	18	200	30	28.27			M	AA		29.81
04	1255	0	CLR	3.00		91	33.0	64	17.7	45	7.0	20	24	200	34	28.25			M	AA		29.79
04	1315	0	CLR	3.00		91	33.0	64	17.7	45	7.0	20	23	200	36	28.23			M	AA		29.77
04	1335	0	CLR	8.00		90	32.0	64	17.5	45	7.0	21	24	190	33	28.23			M	AA		29.77
04	1355	0	CLR	4.00		88	31.0	63	17.1	45	7.0	22	28	200	34	28.23			M	AA		29.77
04	1415	0	CLR	3.00		88	31.0	63	17.1	45	7.0	22	23	200	34	28.23			M	AA		29.77
04	1435	0	CLR	4.00		88	31.0	62	16.7	43	6.0	21	22	210	30	28.22			M	AA		29.76
04	1455	0	CLR	2.50		88	31.0	62	16.7	43	6.0	21	20	200	30	28.22			M	AA		29.76
04	1515	0	CLR	3.00		88	31.0	62	16.7	43	6.0	21	23	210	30	28.22			M	AA		29.76
04	1535	0	BKN005 OVC010	0.50		88	31.0	62	16.7	43	6.0	21	24	200	38	28.21			M	AA		29.75
04	1555	0	SCT008 BKN012	1.75		88	31.0	62	16.7	43	6.0	21	30	190	38	28.20			M	AA		29.74
04	1615	0	FEW022	2.50		88	31.0	61	16.3	41	5.0	19	24	200	34	28.21			M	AA		29.75
04	1635	0	CLR	10.00		82	28.0	64	17.7	52	11.0	35	13	210	20	28.22			M	AA		29.76
04	1655	0	CLR	10.00		82	28.0	63	17.1	50	10.0	33	18	200	23	28.22			M	AA		29.76
04	1715	0	CLR	10.00		84	29.0	62	16.4	45	7.0	26	17	240	31	28.23			M	AA		29.77
04	1735	0	FEW090	10.00		81	27.0	64	17.5	52	11.0	37	14	270	20	28.24			M	AA		29.78
04	1755	0	FEW090	10.00		79	26.0	63	17.1	52	11.0	39	17	260		28.25			M	AA		29.80
04	1815	0	FEW080	10.00		75	24.0	62	16.8	54	12.0	48	18	270	25	28.27			M	AA		29.81
04	1835	0	CLR	10.00		73	23.0	60	15.4	50	10.0	44	21	270	26	28.27			M	AA		29.82
04	1855	0	CLR	10.00		72	22.0	59	15.1	50	10.0	46	13	270	24	28.28			M	AA		29.83
04	1915	0	CLR	10.00		72	22.0	59	15.1	50	10.0	46	17	270	22	28.29			M	AA		29.84
04	1935	0	CLR	10.00		70	21.0	59	14.7	50	10.0	49	14	280	23	28.31			M	AA		29.86
04	1955	0	SCT120	10.00		68	20.0	59	14.8	52	11.0	57	13	280		28.31			M	AA		29.86
04	2015	0	SCT110	10.00		68	20.0	58	14.3	50	10.0	53	8	290		28.32			M	AA		29.87
04	2035	0	BKN100 BKN120	10.00		70	21.0	58	14.2	48	9.0	46	10	310		28.32			M	AA		29.87
04	2055	0	FEW050 SCT065 OVC100	10.00		70	21.0	58	14.2	48	9.0	46	11	360		28.33			M	AA		29.88
04	2115	0	FEW065 BKN090 OVC120	10.00		66	19.0	58	14.4	52	11.0	61	11	360		28.33			M	AA		29.88
04	2135	0	BKN120	10.00		66	19.0	58	14.4	52	11.0	61	5	310		28.33			M	AA		29.88
04	2155	0	FEW090 SCT120	10.00		66	19.0	57	13.8	50	10.0	57	9	020		28.33			M	AA		29.88
04	2215	0	FEW055 SCT080 BKN110	10.00		66	19.0	57	13.8	50	10.0	57	5	080		28.34			M	AA		29.89
04	2235	0	FEW055 BKN080 OVC110	10.00		68	20.0	59	14.8	52	11.0	57	5	020		28.34			M	AA		29.89
04	2255	0	SCT080 SCT110	10.00		66	19.0	58	14.4	52	11.0	61	6	070		28.34			M	AA		29.89
04	2315	0	FEW100	10.00		66	19.0	59	15.0	54	12.0	65	7	100		28.34			M	AA		29.89
04	2335	0	CLR	10.00		64	18.0	57	14.0	52	11.0	65	7	100		28.34			M	AA		29.89
04	2355	0	CLR	10.00		64	18.0	57	14.0	52	11.0	65	7	100		28.34			M	AA		29.89

Figure A-8. Quality-controlled local climatological data hourly observations table for Casa Grande Municipal Airport, Casa Grande, Arizona (10/04/2011). Strong south-southwesterly winds were reported during the afternoon hours with severe reductions in visibility. Dynamically generated via http://cdo.ncdc.noaa.gov/qclcd/QCLCD.

Appendix B:
ADEQ and NWS Forecasts and Advisories

ADEQ Arizona Department of Environmental Quality



LINK TO 2011 AIR POLLUTION EXCEEDANCE GRAPH

AIR QUALITY FORECAST FOR TUESDAY, OCTOBER 04, 2011

This report is updated by 1:00 p.m. Sunday thru Friday and is valid
for areas within and bordering Maricopa County in Arizona

FORECAST DATE NOTICES (*SEE BELOW FOR DETAILS) AIR POLLUTANT	YESTERDAY SUN 10/02/2011 NONE Highest AQI Reading/Site (Preliminary data only)	TODAY MON 10/03/2011 DUST	TOMORROW TUE 10/04/2011 DUST	EXTENDED WED 10/05/2011 NONE
O3*	64 PHOENIX SUPERSITE	50 GOOD	44 GOOD	42 GOOD
CO*	07 GREENWOOD & WEST PHOENIX	09 GOOD	08 GOOD	10 GOOD
PM-10*	41 WEST PHOENIX	50 GOOD	84 MODERATE	56 MODERATE
PM-2.5*	32 WEST PHOENIX	30 GOOD	43 GOOD	34 GOOD

* O3 = Ozone CO = Carbon Monoxide PM-10 = Particles 10 microns & smaller PM-2.5 = Particles smaller than 2.5 microns

*"Ozone Health Watch" means that the highest concentration of OZONE may approach the federal health standard.
"PM-10 or PM-2.5 Health Watch" means that the highest concentration of PM-10 or PM-2.5 may approach the federal health standard.
"High Pollution Advisory" means that the highest concentration of OZONE, PM-10, or PM-2.5 may exceed the federal health standard.
"DUST" means that short periods of high PM-10 concentrations caused by outflow from thunderstorms are possible.

Health message for Monday October 03: No health impacts are expected.

Health message for Tuesday October 04: Unusually sensitive people should consider reducing prolonged or heavy exertion.

Synopsis and Discussion

PARTICLES: The first in a series of vigorous upper level disturbances in the mid-latitude storm track will impact Arizona during this forecast period. Gusty gradient winds are likely by Tuesday the afternoon, although considerable mostly high cloud cover may keep gradient wind speeds below their potential. This disturbance will also be capable of spawning showers and/or thunderstorms with the possibility of strong downdrafts and episodes of dense blowing dust in the Phoenix metro area. As a result, until or unless significant rainfall occurs there is the potential for elevated PM-10 (coarse particle) levels tomorrow.
OZONE: Gusty winds at times, lowering temperatures, and an increase in daytime cloud cover the next few days should help to lower Valley ozone levels into the good range of the Air Quality Index Tuesday and Wednesday.

MONITORING SITE MAPS: STATIC MAP – http://www.azdeq.gov/environ/air/monitoring/images/map.jpg
INTERACTIVE MAPS – http://aqwww.maricopa.gov/AirMonitoring/SitePollutionMap.aspx
http://www.airnow.gov/

POLLUTION MONITOR READINGS FOR SUNDAY, OCTOBER 02, 2011

O3 (OZONE)

SITE NAME	MAX 8-HR VALUE (PPB)	MAX AQI	AQI COLOR CODE
Apache Junction (Pinal County)	49	42	
Blue Point	51	43	
Central Phoenix	57	48	
Fountain Hills	57	48	
North Phoenix	61	54	
Phoenix Supersite	64	64	
Pinnacle Peak	53	45	
South Phoenix	56	47	
South Scottsdale	59	50	
West Phoenix	60	51	

CO (CARBON MONOXIDE)

SITE NAME	MAX 8-HR VALUE (PPM)	MAX AQI	AQI COLOR CODE
Buckeye	0.0	00	
Central Phoenix	26	24	
Dysart	0.2	02	
Glendale	0.4	05	
Greenwood	0.6	07	
Mesa	0.3	03	
North Phoenix	0.2	02	
Phoenix Supersite	NOT AVBL	NOT AVBL	NOT AVBL
South Phoenix	0.5	06	
South Scottsdale	0.4	05	
Tempe	0.5	06	
West Chandler	0.2	02	
West Phoenix	0.6	07	

ADEQ Arizona Department of Environmental Quality

MARICOPA COUNTY DUST CONTROL FORECAST

ISSUED MONDAY, OCTOBER 03, 2011

Five-day weather outlook:

A series of vigorous upper level disturbances in the mid-latitude storm track will impact Arizona during this forecast period. In addition to gusty gradient winds at times, these disturbances will be capable of spawning showers and/or thunderstorms capable of generating strong downdrafts and dense blowing dust in the Phoenix metro area on Tuesday but especially on Thursday. As a result, until or unless significant rainfall occurs there will be a moderate to high risk of unhealthy PM-10 levels both days.

R I S K F A C T O R S

	WINDS		STAGNATION		UNHEALTHY PM-10 RISK LEVEL
Day 1: Tue 10/04/2011	South to southwesterly 15-25 mph with gusts near 30 mph except strong and gusty due to outflow from thunderstorms.	+	No stagnation expected.	=	MODERATE
Day 2: Wed 10/05/2011	Southwesterly 15-25 mph during the afternoon.	+	Somewhat stagnant during the morning hours.	=	LOW
Day 3: Thu 10/06/2011	Southwesterly 20-30 mph with gusts near 40 mph except even stronger due to outflow from thunderstorms.	+	No stagnation expected.	=	HIGH
EXTENDED OUTLOOK					
Day 4: Fri 10/07/2011	Northwesterly 10-20 mph	+	Somewhat stagnant during the morning hours.	=	LOW
Day 5: Sat 10/08/2011	Northerly 5-15 mph	+	Somewhat stagnant during the morning hours.	=	LOW

The Maricopa County Dust Control Action Forecast is issued to assist in the planning of work activities to help reduce dust pollution. A recorded message of this forecast can be accessed at 602-771-2368. To review the complete air quality forecast for the Phoenix metropolitan area, as well as the health impacts and reduction methods for different air pollutants, call 602-771-2367 for recorded forecast information or click on ADEQ's Air Quality Forecast at http://www.azdeq.gov/environ/air/ozone/ensemble.pdf.

CKR 04/28/2011

National Weather Service Tucson Forecast Products

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE TUCSON AZ
310 AM MST TUE OCT 4 2011

.SYNOPSIS...AN APPROACHING WEATHER SYSTEM WILL BRING A CHANCE OF SHOWERS AND THUNDERSTORMS TODAY ALONG WITH BREEZY TO LOCALLY WINDY CONDITIONS. DRY CONDITIONS ARE EXPECTED ON WEDNESDAY. A STRONG LOW PRESSURE SYSTEM WILL THEN BRING WINDY CONDITIONS...MUCH COOLER TEMPERATURES...AND ANOTHER CHANCE OF SHOWERS AND THUNDERSTORMS THURSDAY. EXPECT DRY CONDITIONS WITH BELOW NORMAL DAYTIME TEMPERATURES THIS WEEKEND.

.DISCUSSION...FALL IS HERE AS A SERIES OF UPPER LEVEL TROFS WILL PUSH THROUGH THE AREA THIS WEEK...BRINGING A CHANCE OF SHOWERS AND THUNDERSTORMS...BREEZY TO WINDY CONDITIONS...MUCH COOLER TEMPERATURES AND POSSIBLY A FEW FLAKES IN THE WHITES.

INFRARED IMAGERY THIS MORNING SHOWED PARTLY TO MOSTLY CLOUDY SKIES FROM TUCSON EAST WITH CLEAR SKIES ACROSS THE REMAINDER OF SOUTHEAST ARIZONA. HIGH LEVEL CLOUDS WERE STARTING TO PUSH INTO WESTERN ARIZONA IN ADVANCE OF WEATHER SYSTEM MOVING TOWARD SOUTHERN CALIFORNIA. THIS FEATURE WILL MOVE THROUGH SOCAL LATER THIS MORNING AND INTO WESTERN ARIZONA THIS AFTERNOON AND BECOME NEGATIVELY TILTED. HAVE SEEN A FEW LIGHT SPRINKLES THIS MORNING FROM TUCSON EAST WITH SCATTERED SHOWERS AND THUNDERSTORMS DEVELOPING LATER TODAY AS UPPER DYNAMICS INCREASE OVER THE AREA. A FEW STORMS OUT WEST COULD BECOME STRONG THIS AFTERNOON AND LOW LEVEL JET INCREASES OVER THIS AREA. WITH PRESSURE GRADIENT INCREASING OVER THE AREA EXPECT BREEZY TO LOCALLY WINDY CONDITIONS...WITH STRONGEST GUSTS FROM TUCSON WEST. HIGHS TODAY WILL BE AT OR A FEW DEGREES COOLER THAN MONDAY.

HAZARDOUS WEATHER OUTLOOK
TOHONO O'ODHAM NATION-UPPER SANTA CRUZ RIVER VALLEY/ALTAR VALLEY-
TUCSON METRO AREA-SOUTH CENTRAL PINAL COUNTY-
SOUTHEAST PINAL COUNTY-UPPER SAN PEDRO RIVER VALLEY-
EASTERN COCHISE COUNTY BELOW 5000 FEET-UPPER GILA RIVER VALLEY-
GALIURO AND PINALENO MOUNTAINS-CHIRICAHUA MOUNTAINS-
DRAGOON AND MULE AND HUACHUCA AND SANTA RITA MOUNTAINS-
CATALINA AND RINCON MOUNTAINS-BABOQUIVARI MOUNTAINS-
749 AM MST TUE OCT 4 2011

THIS HAZARDOUS WEATHER OUTLOOK IS FOR PORTIONS OF SOUTHEAST ARIZONA.

.DAY ONE...TODAY AND TONIGHT

ISOLATED TO SCATTERED THUNDERSTORMS WILL OCCUR THIS AFTERNOON AND TONIGHT. STRONG GUSTY WINDS WITH AREAS OF BLOWING DUST WILL BE POSSIBLE WITH SOME STORMS.

.DAYS TWO THROUGH SEVEN...WEDNESDAY THROUGH MONDAY

DRIER CONDITIONS WILL OCCUR WEDNESDAY. THEREAFTER...A STRONG LOW

PRESSURE SYSTEM WILL BRING BREEZY TO WINDY CONDITIONS...A CHANCE
OF SHOWERS AND THUNDERSTORMS...AND MUCH COOLER TEMPERATURES
THURSDAY AND FRIDAY. DRY CONDITIONS ARE FORECAST SATURDAY INTO
MONDAY WITH A WARMING TREND BACK TO NEAR NORMALS.

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE TUCSON AZ
1216 PM MST TUE OCT 4 2011

AZZ503-504-507-508-042130-
UPPER SANTA CRUZ RIVER VALLEY/ALTAR VALLEY-TUCSON METRO AREA-
UPPER SAN PEDRO RIVER VALLEY-
EASTERN COCHISE COUNTY BELOW 5000 FEET-
INCLUDING...NOGALES...TUCSON...GREEN VALLEY...MARANA...VAIL...
SIERRA VISTA...BENSON...WILLCOX...DOUGLAS
1216 PM MST TUE OCT 4 2011

.NOW...
GUSTY WINDS WILL LIKELY GENERATE AREAS OF BLOWING DUST THIS
AFTERNOON. VISIBILITIES ARE GENERALLY EXPECTED TO REMAIN ABOVE 1
MILE...BUT COULD BRIEFLY DROP LOWER IN SOME AREAS. ISOLATED
SHOWERS AND THUNDERSTORMS COULD ENHANCE THE BLOWING DUST THREAT.

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE TUCSON AZ
1257 PM MST TUE OCT 4 2011

AZZ503-504-507-508-042200-
UPPER SANTA CRUZ RIVER VALLEY/ALTAR VALLEY-TUCSON METRO AREA-
UPPER SAN PEDRO RIVER VALLEY-
EASTERN COCHISE COUNTY BELOW 5000 FEET-
INCLUDING...NOGALES...TUCSON...GREEN VALLEY...MARANA...VAIL...
SIERRA VISTA...BENSON...WILLCOX...DOUGLAS
1257 PM MST TUE OCT 4 2011

.NOW...
GUSTY WINDS WILL LIKELY GENERATE AREAS OF BLOWING DUST THIS
AFTERNOON. VISIBILITIES ARE GENERALLY EXPECTED TO REMAIN ABOVE 1
MILE...BUT COULD BRIEFLY DROP LOWER IN SOME AREAS. ISOLATED
SHOWERS AND THUNDERSTORMS COULD ENHANCE THE BLOWING DUST THREAT.

BLOWING DUST ADVISORY
URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE TUCSON AZ
103 PM MST TUE OCT 4 2011

...BLOWING DUST ADVISORY IN EFFECT UNTIL 7 PM MST THIS EVENING...

AZZ501>515-050200-
/O.NEW.KTWC.DU.Y.0001.111004T2003Z-111005T0200Z/
WESTERN PIMA COUNTY-TOHONO O'ODHAM NATION-
UPPER SANTA CRUZ RIVER VALLEY/ALTAR VALLEY-TUCSON METRO AREA-
SOUTH CENTRAL PINAL COUNTY-SOUTHEAST PINAL COUNTY-
UPPER SAN PEDRO RIVER VALLEY-
EASTERN COCHISE COUNTY BELOW 5000 FEET-UPPER GILA RIVER VALLEY-
WHITE MOUNTAINS OF GRAHAM AND GREENLEE COUNTIES-
GALIURO AND PINALENO MOUNTAINS-CHIRICAHUA MOUNTAINS-

DRAGOON AND MULE AND HUACHUCA AND SANTA RITA MOUNTAINS-
CATALINA AND RINCON MOUNTAINS-BABOQUIVARI MOUNTAINS-
INCLUDING THE CITIES OF...AJO...ORGAN PIPE CACTUS N.M....SELLS...
NOGALES...TUCSON...GREEN VALLEY...MARANA...VAIL...
PICACHO PEAK STATE PARK...MAMMOTH...ORACLE...SIERRA VISTA...
BENSON...WILLCOX...CLIFTON...SAFFORD...HANNAGAN MEADOW...
MOUNT GRAHAM...CHIRICAHUA NM...BISBEE...CANELO HILLS...
MADERA CANYON...MOUNT LEMMON...SUMMERHAVEN
103 PM MST TUE OCT 4 2011

...BLOWING DUST ADVISORY IN EFFECT UNTIL 7 PM MST THIS EVENING...

THE NATIONAL WEATHER SERVICE IN TUCSON HAS ISSUED A BLOWING DUST ADVISORY...WHICH IS IN EFFECT UNTIL 7 PM MST THIS EVENING.

* TIMING...AREAS OF BLOWING DUST WITH VISIBILITIES UNDER A MILE WILL BE POSSIBLE THROUGH 7 PM.

* WINDS...SUSTAINED WINDS FROM 20 TO 30 MPH WITH GUSTS TO 45 MPH WILL BE POSSIBLE.

* VISIBILITY...VISIBILITIES WILL BE REDUCED TO UNDER ONE MILE IN BLOWING DUST AT TIMES.

* IMPACTS...TRAVELERS ALONG AREA HIGHWAYS WILL ENCOUNTER SUDDEN VISIBILITY REDUCTIONS UNDER ONE MILE.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A BLOWING DUST ADVISORY MEANS THAT BLOWING DUST WILL RESTRICT VISIBILITIES BELOW ONE MILE IN SOME AREAS. TRAVELERS ARE URGED TO USE CAUTION. IF YOU ENCOUNTER LOCALIZED DENSE BLOWING DUST... ESPECIALLY NEAR PLOWED FIELDS OR CONSTRUCTION SITES...DO NOT DRIVE INTO IT IF AT ALL POSSIBLE.

PRELIMINARY LOCAL STORM REPORT
NATIONAL WEATHER SERVICE TUCSON AZ
321 PM MST TUE OCT 04 2011

..TIME...	...EVENT...	...CITY LOCATION...	...LAT.LON...
..DATE...	....MAG....	..COUNTY LOCATION..ST..	...SOURCE....
	..REMARKS..		
0321 PM	DUST STORM	5 SE PICACHO	32.66N 111.43W
10/04/2011		PINAL AZ	BROADCAST MEDIA
	*** 1 FATAL, 15 INJ *** 36 VEHICLE CRASH ON I-10 AT MILEPOST 217 DUE TO BLOWING DUST. TIME APPROXIMATE.		

Appendix C:
Affidavit of Public Notice